THE JOURNAL OF PERIODONTOLOGY

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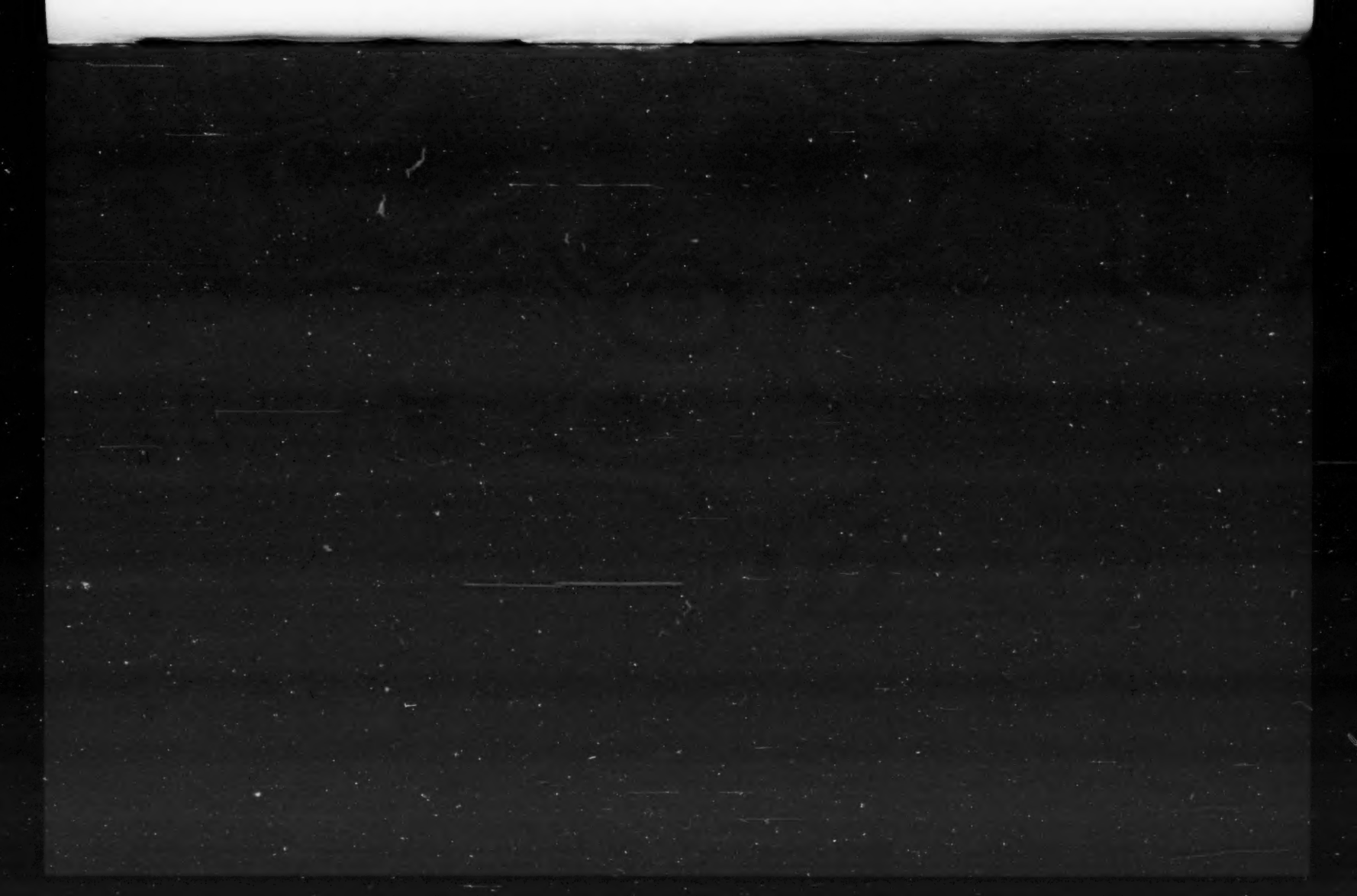
Published by
THE AMERICAN ACADEMY OF PERIODONTOLOGY
VOLUME 28
NUMBER 1 - 4



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The Journal of Periodontology
is dedicated to

Dr. Gillette Hayden

and

Dr. Grace Rogers Spalding

for their pioneer efforts and
selfless devotion in behalf
of periodontia and the
American Academy
of Periodontology

THE JOURNAL OF PERIODONTOLOGY
(J. Periodont.)

Published Quarterly—January, April, July, and October—By

THE AMERICAN ACADEMY OF PERIODONTOLOGY

Publication Office: 2620 FLETCHER ST., CHICAGO 18, ILL.
Editorial Office: 1121 WEST MICHIGAN ST., INDIANAPOLIS 2, INDIANA
Single copies of this number may be obtained from
Editorial Office at $2.00 each
Subscription Price $8.00
All foreign subscriptions to be paid in United States money

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The Journal of Periodontology, Vol. 28, No. 1, January, 1957. Published by the American Academy of Periodontology. Publication office, 2620 Fletcher St., Chicago 18, Ill. Editorial office, 1121 W. Michigan St., Indianapolis 2, Ind. Yearly subscription, $8.00. Single copy, $2.00. Entered as second-class matter at the post office at Chicago, Ill. Published quarterly. Copyright 1957 by the American Academy of Periodontology.

THE JOURNAL OF PERIODONTOLOGY is published to serve as the professional journal of periodontia; to keep dentists in touch with research being carried on in this field and related sciences; to stimulate greater interest in the supporting tissues of the teeth and their relation to oral and general health.

The Journal is the official organ of the American Academy of Periodontology and will contain, therefore, papers of scientific and clinical interest which are presented at the annual meetings of that society, as well as articles submitted direct to the Editor. Obviously opinions expressed do not necessarily represent those of the Editor or the American Academy of Periodontology.

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of

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Dr. Stanley C. Baker of Greenwood, South Carolina, is an active member of the South Carolina Dental Association, the American Dental Association, the Southern Academy of Periodontology, the American Academy of Periodontology, the International College of Dentists, past president of the Southern Academy of Oral Surgery, and is certified by the American Board of Periodontology. He has served as a member of the Council of the American Academy of Periodontology for the past 10 years and is now Chief of Dental Staff of the Self Memorial Hospital in Greenwood, South Carolina.

Dr. Baker was graduated from Atlanta Southern Dental College in 1915 (now Emory University School of Dentistry). After practicing dentistry in Ware Shoals for one year, he moved to Greenwood and has been practicing in Greenwood, South Carolina for the past 36 years.

He has achieved success in the field of general dentistry with special emphasis on Surgery and Prosthodontia. He is well qualified for the honor now bestowed on him as President of the A.A.P. He is married to the former Mary Nicholson of Edgefield, South Carolina and has two children Stanley C. Baker, Jr., M.D., and Mrs. W. W. Johnson (nee Pierrine).

THE JOURNAL OF PERIODONTOLOGY

JANUARY, NINETEEN HUNDRED FIFTY-SEVEN

Experimental Production of Periodontitis in Dogs

by C. KENNETH COLLINGS, B.S., M.A., D.D.S.,* *Dallas, Texas*

MAN, among all the animals, is probably the only one in which periodontal disease is common. Consequently, the human mouth has to serve as the chief source of information in studies on periodontitis. Unfortunately, the use of human subjects for experimental purposes has very definite limitations. The experimental treatment of disease in man has been done extensively, but the experimental production of disease in man meets with considerable disfavor, particularly from the intended victim. Therefore, we find many fine papers published which report experimental methods of treating periodontal disease in man, but reports of experimentally induced periodontal disease in human subjects are rare.

Since animals are not usually subject to periodontitis, it becomes necessary to devise means of inducing this condition if animals are to be used for such studies. The literature reports several efforts to produce pocket formation in animals. McCall,[1] Miller and Sorrin[2] and Skillen and Lundquist[3] have created periodontal pockets in dogs by surgically separating the gingival tissues from the underlying structures and by the use of sodium sulphide. They do not mention observations on bone loss or periodontitis. Swenson[4] has created periodontal pockets in dogs by dissecting the gingival tissues from around the canine teeth and adapting copper bands reaching to the bottom of the dissected pockets around these teeth. He reports the pockets permanent up to 150 days with no reattachment, but does not mention deepening because of subsequent bone loss. Linghorne and O'Connell[5,6,7] have created periodontal pockets in dogs by dissecting the gingival tissues from around the canine teeth and then removing a piece of alveolar bone over the labial surface of these teeth. The flaps were sutured back in place with only blood clot in place,[5] with bone chips in the pockets[6] or with periodontal pack inside[7] and pockets were thus formed. These authors described considerable bone regeneration but no further bone loss.

Beube and Silvers,[8] in studies on bone regeneration, removed bone from the sides of the maxillary arch in dogs but did not report bone loss. Glickman[9] induced diabetes in rats and reported degenerative changes resembling osteoporosis in the alveolar bone. Schour[10] did hypophysectomies on rats and detected changes in the alveolar bone. Boyle and coworkers[11,12] have produced alveolar

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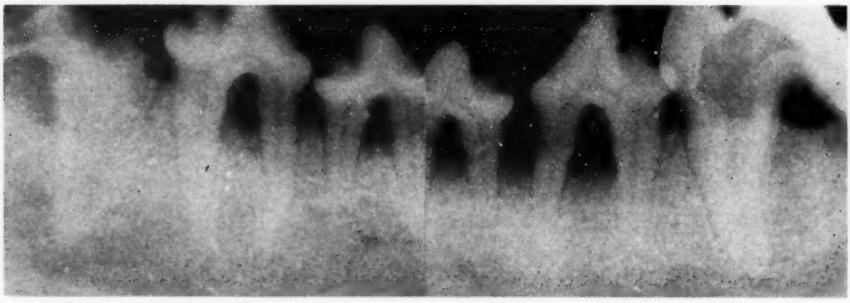

Fig. 1. Radiographs of the left and right sides of the mandible of the original female dog after sixteen months.

bone changes by feeding guinea pigs on diets deficient in vitamins A and C. Ramfjord,[13,14] in his studies on reattachment, created periodontal pockets in the monkey by the method used by Swenson[4] but reported no deepening of these pockets during the experiment. Morris[15] created periodontal pockets around periodontally sound teeth in humans in order to study reattachment. He did not report further bone loss following the experimental procedure.

None of these reports mention the type of marginal alveolar bone loss commonly seen in periodontitis. These studies were concerned with the problem of reattachment in experimentally produced periodontal pockets and, apparently, no observations were made to determine if these pockets might deepen due to subsequent bone loss.

Many of the studies conducted on reattachment are subject to the criticism that the process was being studied in pockets having very little resemblance to those seen in periodontitis. Surgical insult is offered to the oral tissues millions of times yearly and healing is accepted as a routine expectation. There is no reason to expect that any different sequelae would follow the surgical production of periodontal pockets, especially if these pockets are created in terms of only a few millimeters extent.

It would seem of value if a technique could be found for producing a periodontitis in experimental animals which would more nearly simulate periodontitis in man than does the surgical pocket. This paper describes such a technique as used on dogs.

TECHNIQUE AND RESULTS

All dogs used in this study are mongrel dogs which were delivered to the school from the local animal shelter or are the offspring of matings between such dogs. The first dog used was a female of unknown age and parentage, delivered to the school in October 1950. All dogs since have been her offspring or offspring of her daughters by matings with various males of unknown ancestry.

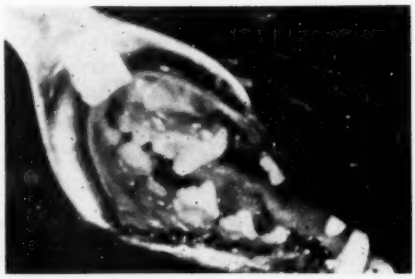

Fig. 2. Photograph of the right side of the mouth of the original female dog after thirty-four months. Note the carious molar and the exposed cementum of the two bicuspids. The margin of the gingiva is acutely inflamed and pockets of several millimeters can be probed.

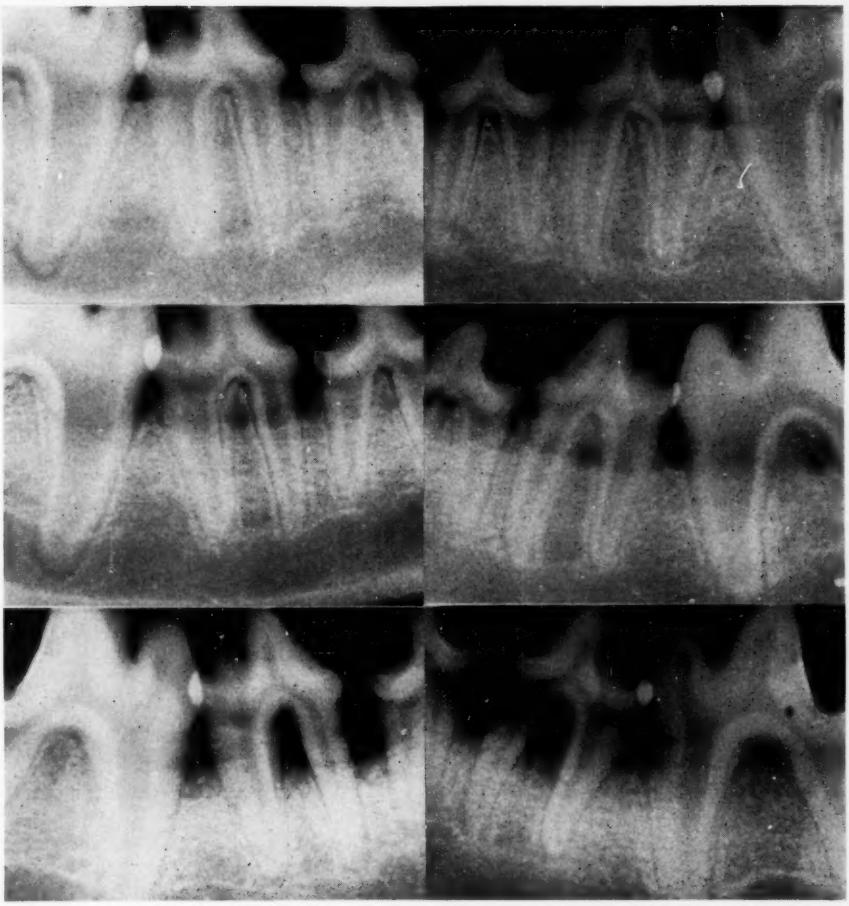

Fig. 3. Top: Left and right sides before surgery. Middle: Same dog immediately following surgery. The area of surgical trauma can be seen. Bottom: Same dog after four months. This was a male offspring of the original female dog.

On October 27, 1950 the dog was anesthetized with nembutal intraperitoneally and preoperative radiographs were made. The gingiva around the bicuspids and first molar on both the right and left sides of the mandible was reflected away from the teeth and from the supporting bone on the buccal and lingual surfaces. Using a mallet and chisel, about two or three millimeters of the crestal marginal alveolar bone was removed buccally and lingually from both the right and left sides of the arch. A bone bur was used to remove the crest of bone between the roots of the teeth. The soft tissues were then replaced and held in position by cotton thread sutures between and around the teeth. Postoperative radiographs were then made.

The gingiva of the dog was very thin and fragile and every possible precaution was taken to prevent the animal from tearing the sutures from the soft tissues. Canned dog food was mixed with milk and made into a thin gruel so no chewing would be necessary. This gruel was fed for

two weeks after which it was felt that the healing had progressed to the point where the gingiva would stay in place even if bones were gnawed. At this time the animals were returned to a diet consisting of table scraps collected from Baylor Hospital. The sutures had been removed after ten days at which time it was found that, even with the gruel, some sutures had been torn from the tissue. However, the tissue appeared to be well adapted to the underlying bone and around the teeth.

Radiographs and observations were made after two weeks, five weeks, seven weeks and twelve weeks. The radiographs show a progressive deterioration of the crest of the alveolar bone with the customary signs of bone loss as seen in advanced cases of periodontitis in the human. Clinical observations at seven and twelve weeks showed that an acute gingivitis had developed. A periodontal probe could be introduced into periodontal pockets up to five millimeters and finger pressure on the outside of the pocket area would express a creamy, purulent-appearing fluid.

Fig. 4. Photograph of the left side of the mandible of the male dog shown in Figure 3. This dog was sacrificed two weeks after the radiographs in Figure 3 were taken.

No further observations were made until thirteen months later at which time it was found the mouth had an extremely foul smell and the periodontal breakdown had proceeded further. Radiographs showed extensive bone loss and that both mandibular first molars were carious (Fig. 1). The involved teeth were mobile.

At this time, certain experimental procedures were performed on the left side of the mouth of this dog which will be reported subsequently and have no bearing on this paper. However, observations were continued on the right side of the mouth as the destruction of the area proceeded. The teeth continued mobile. The caries finally destroyed the first molar and the roots were exfoliated. The mouth was extremely foul during all of this time (Fig. 2). The dog is still living in August 1956, four years and eight months after the experiment was started.

Four other dogs had similar surgery done in early 1953 and two more in early 1956. Five of these animals are still living. In every case the same sequelae occurred, with minor variations, and all the dogs have periodontitis ranging in severity according to the time since the surgery was performed (Figs. 3 and 4).

SUMMARY

A method of creating periodontitis around several teeth at once, in dogs, has been described. The method is simple and has been successful, over a period of six years, on every animal used which survived long enough for periodontitis to develop. It is hoped that the use of this technique may provide additional material for the study of periodontal disease.

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Quantitative Evaluation of the Therapeutic Effect of Selective Grinding*

by HANS R. MÜHLEMANN, HANS HERZOG AND KLAUS H. RATEITSCHAK,
Zurich, Switzerland

TRAUMATIC occlusion today is accepted as a contributory factor in periodontal disease.[1] Occlusal trauma is defined as a condition produced by abnormal occlusal masticatory and parafunctional[2] stress on the tooth supporting structures. One of the methods of treating traumatic occlusion is *selective grinding*. It aims at a symmetrical, balanced, harmonious and equal distribution of forces during mastication and swallowing. Further it aims at the re-establishment of a physiological equilibrium between the factors narrowing ("masticatory wear") or broadening ("horizontal wear") the occlusal contact surface.[3] No quantitative studies are found in the literature demonstrating the therapeutic effect of grinding methods. It is the purpose of this report to show the changes occurring in periodontal structures as a consequence of selective grinding. The therapeutic effect of selective grinding was evaluated by tooth-mobility measurements. Tooth-mobility is closely related to occlusal function and to abnormal stress. This has been shown previously in several investigations.[4-8, 13]

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MATERIAL AND METHODS

Nine periodontal patients, 19 to 46 years old, were selected. They were all cases having *unilateral masticatory function* for many years. Unilateral function was diagnosed from unilateral wear, lateral deviation of the jaw on opening, unilateral tempo-mandibular joint disturbances, from chewing tests and sometimes from the patients history. The preferential or sole chewing side was called: *hyperfunctional side*. The balancing side was the *hypofunctional side*. A thorough diagnosis was made as to premature contacts in centric, cusp

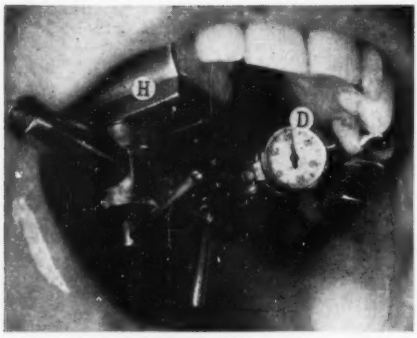

Fig. 1. Periodontometer in situ. Dial indicator (D) attached to holding apparatus (H).

interferences and occlusal contacts in the fundamental excentric occlusal positions. The diagnostic details are described elsewhere.[9]

The *gingival status* was recorded separately for all quadrants of the dentition by means of *Massler's*[10] PMA-Index. Similarly the degree of periodontal bone destruction *(X-ray-Index)* was determined at the level of the interdental septa. It was recorded by measuring in millimeters on standardized X-ray-films the maximum distance from the distal or mesial cemento-enamel junction to the most apically situated horizontal or vertical translucency.

Tooth-mobility was measured by the same investigator (H.H.) before and 14 ± 2 months after selective grinding, with one exception (Case E.V.).

Selective grinding which was the only therapeutic procedure, was performed as described by *Schuyler*.[11] The patients were also given educational advice to chew after selective grinding on the previously non-functioning side.

The apparatus and procedure used for the TM-measurements have been described in principle.[4] The dial-indicator (Periodontometer) and holding apparatus used in this study are illustrated in Figure 1. The error of the method proved to be smaller (± 5%) than previously reported in another study.[12] The labio/buccal-lingual crown-excursions were caused by a 500 Gram force exerted by a dynamometer. Before and after selective grinding 4 readings in hundredths of millimeters were made of each tooth in the upper jaw except for the second molars [T_{500}].

RESULTS

The findings before and after selective grinding are represented in Figures 2 and 3, 5 to 7 and tables I and II.

A. *Tooth-mobility and unilateral function* (before selective grinding).

Eight out of nine patients had unilateral function on the left side. Absolute tooth-mobility values of all 9 patients and from both hypo- and hyperfunctional sides were averaged separately for homologous teeth. The averaged values of homologous teeth were used as the base line for the conversion of single absolute mobility values into relative ones. It can be seen in Figure 2 that the mobility data are greater on the hypofunctional than on the hyperfunctional side. The *mean of the relative mobility* on the *hypo*-functional side (black columns) is 119.3

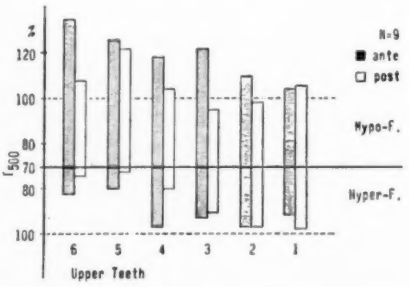

Fig. 2. Tooth-mobility before (black columns) and after (empty columns) selective grinding in 9 patients with unilateral masticatory function.

Ordinate: homologous teeth of hypofunctional (upper half) and hyperfunctional (lower half) side.

Coordinate: Relative values of tooth-mobility (T_{500}) of homologous teeth. The base-line "100%" corresponds to the averaged value of all measurements of each group of both homologous teeth. The columns show the mean percentage deviations of single homologous teeth, separately for the hypo- and hyperfunctional sides.

± 4.5%, on the *hyperfunctional side* 90.0 ± 3.0%, the difference being significant below the 1 0/00 level. Unilateral longlasting function thus produced a mobility difference of approximately 30% between the hypo- and hyperfunctional sides. It has to be noted that this difference was greater for the 6 year molars and second bicuspids and smallest for the incisors.

The degree of periodontal atrophy and gingival inflammation in the nine patients is to be found in table I. There was no significant asymmetry between left and right. The X-ray-index is very low, indicating that the periodontal bone atrophy of the sample was not pronounced.

B. *Tooth-mobility changes after selective grinding.* The changes in mobility brought about by selective grinding may be

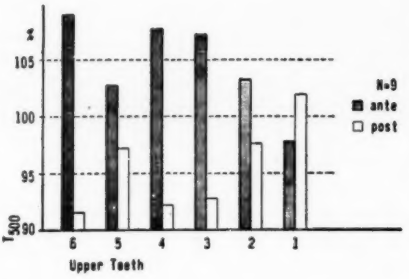

Fig. 3. Tooth-mobility (T_{500}) before (black columns) and after (empty columns) selective grinding in 9 patients with unilateral masticatory function.

The base-line "100%" corresponds to the averaged value of all measurements of each group of both homologous teeth. The columns show the mean percentage deviations from the base-line together for the hypo- and hyperfunctional side.

seen in Figure 3, where the black columns represent relative pregrinding values and the empty columns postgrinding values of homologous teeth (i.e. for both upper 6-year-molars, both upper second bicuspids). Selective grinding profoundly influenced the mobility of 6 5 4 3 + 3 4 5 6, but less in the upper lateral incisors. There was an increase in mobility in the central incisors after selective grinding. The mean mobility decrease for all teeth except the upper central incisors was 26.8%. Figure 2 shows the mobility changes separately for the hypo- and hyperfunctional sides. Selective grinding reduced the mobility on both hypo- and hyperfunctional sides, except for the upper central incisors. The mean reduction was greater on the hypofunctional side (18.1%) than on the hyperfunctional side (8.7%). The mobility changes as summarized in Figures 2 and 3 may be much more pronounced and individualistic in single cases. Two examples, expressed in absolute mobility values, will be given.

Case I, A.H.

Table II represents the mobility status of a 31 year old female patient with unilateral function. Normal mobility values are added in table II in order to allow comparison. There was a premature contact between the upper and lower left first molar in centric. Occlusal contacts were: in right lateral occlusion $\frac{7\ 321 + 7}{743\ 1 - 7}$ F in left lateral occlusion $\frac{76 + 2367}{7\ -2367}$ in protrusive occlusion 1 ± 1. In order to make comparison more easy, a summation number of absolute mobility was derived by adding the mobility values of each quadrant separately. The summation number in the right upper hypofunctional quadrant *before selective grinding* was 129.0 (normal = 57), for the left upper hyperfunctional side 86.5. Roughly the mobility of the *hypofunctional side* was 126% higher than normal, on the *hyperfunctional side* 51%, the difference due to unilateral function being 75%.

7 months *after selective grinding* the summation

TABLE I

X-ray-index and PM-index of nine patients with unilateral masticatory function. Mean indeces for the four quadrants of the dentition.

		Hypo-functional side	Hyper-functional side
X-Ray-Index*	Upper jaw	1.85	1.85
	Lower jaw	2.0	1.9
PM-Index**	Upper jaw	0.6	0.7
	Lower jaw	0.5	0.6

* Distance in millimeters from the cemento-enamel junction to the most apically placed horizontal or vertical translucency in the interdental septum of X-ray-films taken under standardized conditions.

***Massler's* PMA-Index, without considering "A."

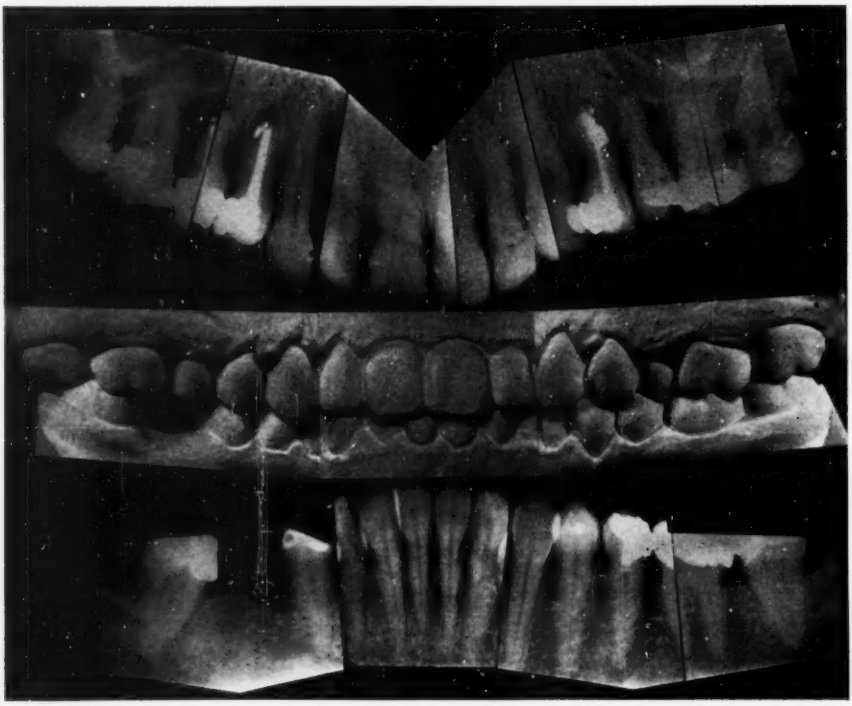

Fig. 4. Case I, A.H. X-ray-examination and occlusion.

number of the *hypofunctional side* was found to be 82 (before 129), of the *hyperfunctional side* 53.8 (before 86.5). On the hypofunctional side mobility values were after grinding still somewhat higher (45%) than normal values. However, the therapeutic effect of selective grinding was of the same intensity in both sides of the dentition. The % mobility decrease for all single teeth is seen in table II. The *average % decrease* in mobility was the same (33%, resp. 32%) for both the hypofunctional and hyperfunctional upper quadrants. It was more uniform on the hypofunctional than on the hyperfunctional. Fig. 4 shows the X-ray-examination of the patient. Mobility values may be compared with the X-ray-diagnosis.

Case II, E.V.

Fig. 5 shows the pre- and postgrinding mobility status of a 35 year old female patient. Due to a cusp interference between the upper and lower left second molar, inhibiting right lateral occlusion, the patient only chewed on the left side for many years. Selective grinding *only consisted in correcting the lingual incline of the buccal cusps of the lower left second molar.* This procedure was followed by mobility changes in all the teeth. The summation number of mobility in the right upper hypofunctional quadrant before selective grinding was 124 (normal 57), in the left upper hyperfunctional side 77. Three months after selective grinding the summation number on the hypofunctional side was found to be 96 (before 124), on the hyperfunctional side 69 (before 77).

DISCUSSION AND CONCLUSIONS

It has been shown by tooth-mobility-measurements made before and after selective grinding that the re-establishment of unimpeded harmonious masticatory function is associated with a decrease in tooth-mobility, indicating an improvement of periodontal health. The fact that mobility values are higher in areas which have been hypofunctional for many years suggests that hypofunction is more detrimental to periodontal structures than hyperfunction.

In patients with unilateral function, loosening of teeth was most pronounced in

TABLE II

Case I.A.H. Tooth-mobility (T_{500}) in mm.10^{-2} of the upper teeth before and after selective grinding. Normal tooth-mobility values for comparison. Percentage decrease in mobility due to selective grinding.

	HYPOFUNCTION						HYPERFUNCTION					
Teeth	6	5	4	3	2	1+	+1	2	3	4	5	6
Normal values (Median)	6	9	10	8	12	12	12	12	8	10	9	6
Before Grinding	20.0	20.3	30.3	17.0	15.0	26.4	13.4	10.0	14.0	22.8	16.7	9.3
After Grinding.....	11.4	15.6	16.8	12.0	13.8	13.2	13.8	9.4	9.6	8.4	6.6	6.0
%-decrease	43	23	45	29	8	50	−1	6	31	63	60	35
Mean %-decrease			33% ± 6.5						32% ± 10.5			

the molars of the balancing side (Figs. 2 and 5, Table II). Teeth with balancing occlusal contacts on the essentially hypofunctional "non-chewing" side seem to be more exposed to occlusal trauma. Hypofunctional periodontal structures are less adapted to resist occlusal stress. In principal, selective grinding should not aim at establishing occlusal contacts on the balancing side, if bilateral symmetric function is not attainable.

Judging from the evidence obtained in this study, the re-establishment of completely equilibrated bilateral function in cases with longlasting unilateral chewing habits seems to be impossible, even if re-educational advice for the treatment of the muscular imbalance is given to the patient. Several months after selective grinding the mobility values of homologous teeth were still asymmetrical (Fig. 2). Mobility was still higher on the formerly definitely hypofunctional molar and premolar region, suggesting that functional symmetry was not achieved. This is also more probable since there was no unilateral periodontal bone atrophy before (Table I), and presumably also after selective grinding, which theoretically might be responsible for asymmetry in mobility after balancing the occlusion.

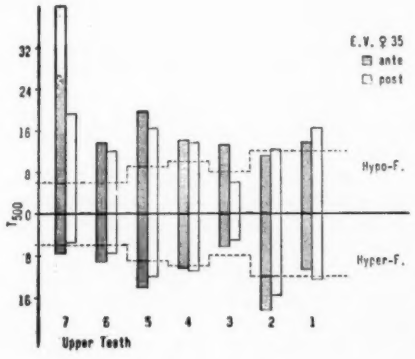

Fig. 5. Tooth-mobility values before (black columns) and after (empty columns) selective grinding (Case II, E.V.).

Ordinate: Homologous teeth of the hypofunctional (upper half) and hyperfunctional (lower half) sides.

Coordinate: Absolute tooth-mobility in hundredths of millimeters. The broken line represents the normal values.

One of the most unexpected results of this study is the fact that *tooth-mobility increased in the central incisors after selective grinding.* This increase was not significant, probably due to variation and to the small sample size. However it was a rather consistent observation and it may be interpreted as being possibly a discrete post-grinding trauma not evident with common clinical diagnostic procedures. Selective grinding, even if greatest care is observed in adjusting centric occlusion, may reduce the height of the bite and thus traumatize the incisors. It is also possible that the reduction of the cusp inclines in lateral grinding according to the BULL-rule pro-

duces a slight mesial thrust of the mandible.

Attention is focused again on Case II where the whole grinding procedure merely consisted in the removal of one sliding interference. This therapeutic act was followed by a profound reduction of the mobility of all the teeth. The close relationship between the functional state of the periodontium and tooth-mobility is evident. Common dental restorations such as functionally inadequate fillings and bridge work similarly may involve changes of masticatory function and have serious repercussions on the whole periodontal system.

SUMMARY

TM was measured in 9 patients with unilateral masticatory function before and after selective grinding. Before grinding, tooth-mobility was *30% higher on the hypofunctional* compared to the hyperfunctional side. It was *highest in the balancing area of the hypofunctional side*. Selective grinding aiming at a *re-establishment of bilateral function reduced mobility* on the hypofunctional side by 18.1%, on the hyperfunctional side by 8.7%. Mobility however increased in both upper central incisors suggesting new occlusal trauma. In patients having asymmetrical function for years it was not possible to obtain by selective grinding complete mobility symmetry of left and right.

The clinical conclusions to be drawn from this study are:

1. The re-establishment of function in hypofunctional areas should be attempted.

2. Occlusal contact in the balancing areas should not be attempted.

3. Care should be taken to check the occlusion of the incisors in centric and protrusion some time after selective grinding.

The authors wish to express their acknowledgement to Dr. C. M. E. Eugster, D.D.S., L.D.S., R.C.S. for assistance in translation.

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A Measure of Tissue Response to Frequency of Toothbrushing

by WILLIAM R. STANMEYER,* D.D.S., *New London, Conn.*

GINGIVAL massage has long been an accepted procedure among most dentists not only in the treatment of a variety of oral soft tissue conditions but also as a necessary procedure to maintain the health of these tissues. The basis of this treatment rests in the belief that: (1) stimulation of a tissue results in an increased circulation and lymphatic drainage through an area;[1] (2) "massage helps other parts of the body, so why wouldn't it help the gingival tissues";[1,2] and (3) increased stimulation causes an increase in tissue hornification and this can be taken as an index of a tissue's resistance to inflammatory change.[3,4] This third point is a relatively new channel of thought since, prior to Orban's work, the general thesis was that, normally, mucous membranes did not become hornified. Orban's histologic analysis showed that, with correct oral hygiene, hornification of the gingiva will occur in varying degrees. Stahl[5] has since shown that the degree of keratinization of the gingiva can be related even to the bristle hardness of the brush used.

Most toothbrush techniques are so designed that in brushing the teeth the gingival mucous membranes receive varying degrees of stimulation. The amount of stimulation may vary from a natural minimal amount of the Charters[6] technique to the frequent and vigorous stimulation with an electric massage unit as advocated by Osserman.[7]

The value of massage had never been seriously questioned until, at the risk of their professional status, several investigators[8,9,10,11,12,13,14] critically reviewed various forms of dental treatment for the scientific background of each. The results of this work indicated that improper massage could be harmful; inefficient care could be useless; the value of massage as a beneficial method of treatment was an opinion without scientific fact; there was no logical rationale for its use, and in some cases, might even produce a subacute bacterial endocarditis.

As might be expected, many investigators immediately presented a defense of their treatment methods. The University of Indiana Dental School[2] conducted a study by comparing brushed and unbrushed sides of the same mouth. Beube[15] compared patients' techniques with those considered more adequate. Several men[3,5] presented histologic evidence that increased gingival keratinization, which they took as a measure of gingival resistance to inflammation, was proportional to the amount of massage. Castenfelt[16] stated that there was therapeutic worth in gingival massage but that it was due to a diminution of inflammatory distension and not to an increase in keratinization.

In 1952 the Report of Evaluating Committee IV on the Treatment of Periodontal Disease,[17] after reviewing the literature, went on record with the statement that home care (massage) is necessary for both prevention and treatment, and that gingival stimulation is beneficial.

In all the work that has been presented on the therapeutic value of massage, it is remarkable that with few exceptions the optimal frequency has not been discussed. This probably can be explained as due to the lack of a suitable measuring device which could accurately measure and compare large samples of subjects. How frequently should the gingivae be massaged? What amount of time should be devoted to gingival stimulation? If a little massage is good, will a great deal be better?

This paper is concerned with a study of the correlation of the oral soft tissue health with the frequency of toothbrushing in an

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attempt to further contribute to the scientific knowledge that the health of the gingivae is increased by massage and that there is an optimal frequency of stimulation through toothbrushing to maintain this healthy state.

METHOD

A carefully prepared and controlled questionnaire was administered to 3,238 young adults ranging in age from 17 to 32 years with a mean of 21.37 years. Their social and educational backgrounds varied from those not finishing grammar school to those with college degrees.

The basic reason for administering the questionnaire was to determine the frequency of toothbrushing. In making any survey in which persons are asked questions concerning their personal hygiene, a natural resistance and reluctance to report deviations of their own from accepted standards must be overcome. Most previous surveys have used the factor of anonymity as the most important point in securing truthful answers, but this single control frequently is insufficient. To overcome this problem, a questionnaire was prepared containing the following points: (1) anonymity; (2) non-compulsion—subjects were told that the investigator would rather that they did not return their papers if they contained any answers they knew to be erroneous; and (3) questions requiring duplicate answers were given in varying parts of the questionnaire so that answers could be compared. For example, the subjects were asked the frequency per day they brushed their teeth, whereas in another part of the questionnaire they were asked when their teeth were brushed. If a person checked that he brushed his teeth three times a day and then checked before breakfast as the only time he brushed his teeth, he was obviously inconsistent in his answering and his questionnaire was discarded.

The method of administration was probably as important as the questionnaire itself. Small groups averaging fifteen persons but never more than thirty were questioned at a time. Prior to distributing the questionnaire, a short explanatory talk was given to each group to explain the reasons for the administration of these questions. The point was stressed that the questionnaire was not compulsory and that we would rather have it returned unanswered than answered in such a manner that it would not reflect a true picture of their habits. The questions were not preread and at a signal from the interrogator were answered at a pace set by him. This pace was of such rapidity that it elicited answers by reflex rather than by objective thinking. When the papers were collected and the data placed on IBM cards, all papers with changes or erasures on key questions were discarded. Using these precautions, 3,068 questionnaires were considered as being of sufficient accuracy to be used in this survey.

Upon completion of the questionnaire, the gingival health of each person was assessed, using the P.M.A. (Papilla, Marginal and Attached gingivae) Index.[18] To satisfy the criticism[19,20] of the use of the index, all examinations were done by the same trained examiner under identical lighting conditions. At no time did the examiner have access to the patient's questionnaire. This forestalled any subconscious tendency to influence the index through a knowledge of the toothbrushing habits.

A general physical examination had been given each subject shortly before the oral examination, and the oral examinations were conducted after the participants had had several nights of uninterrupted sleep. At the time of the examinations the subjects were well rested and in good physical condition.

RESULTS

The frequency of brushing, irrespective of the time during the day utilized, is illustrated in Table 1.

For convenience sake, the PMA indices were grouped into the following increments: 0-4, 5-9, 10-14, 15-19, 20-24,

TABLE 1

Toothbrushing Frequencies

Never	7
Occasionally but no set routine	352
Once a day	1108
Twice a day	1262
Three times a day	339

25-29, 30 + units. The index was recorded as merely the existence of inflammation in an area. For purposes of uniformity and to minimize the possibility of error, the severity of the inflammatory condition was not taken into consideration. A PMA Index of 7, therefore, was placed in the 5-9 increment and meant that the subject exhibited that number of inflamed areas of unrecorded intensity. Table 2 correlates the relationship between frequency of brushing and the amount of observed clinical gingival irritation.

The percentages in each grouping of Table 2 are expressed in graphic form in Figure 1.

The question was asked each person whether or not they had ever received instruction in the method of brushing their teeth and the use of the toothbrush. Of the 3,068 questionnaires used, 2,714 answers were in the affirmative, while only 354 of the total said they had never been told of any method of toothbrushing.

The amount of time spent at each brushing was the subjects' estimate and, due to the general inability to accurately estimate the passage of small amounts of time, cannot be considered as a proven fact. It is interesting to note, though, that 79.6 per cent of all subjects thought they brushed between one and two minutes each time, 6.5 per cent brushed less than a minute, and the other 13.9 per cent more than two minutes, even though the possible choice of time ranged from 30 seconds to 10 minutes.

Since several investigators have shown that gingival keratinization was proportional not only to the amount of massage but even to the hardness of the bristles of the brush, the participants in this survey were asked the frequency with which they purchased new brushes. Once again the results fell within very narrow limits with 81.6 per cent purchasing a new brush each two or three months. Five persons stated that they had no brush and had never purchased one.

The number of persons routinely and specifically using additional aids for gingival stimulation in their oral hygiene routine was extremely small. Only 285 (.09%) persons routinely used such adjuncts as finger massage, dental floss, stimulator tips, or some other form of gingival stimulation.

DISCUSSION AND CONCLUSIONS

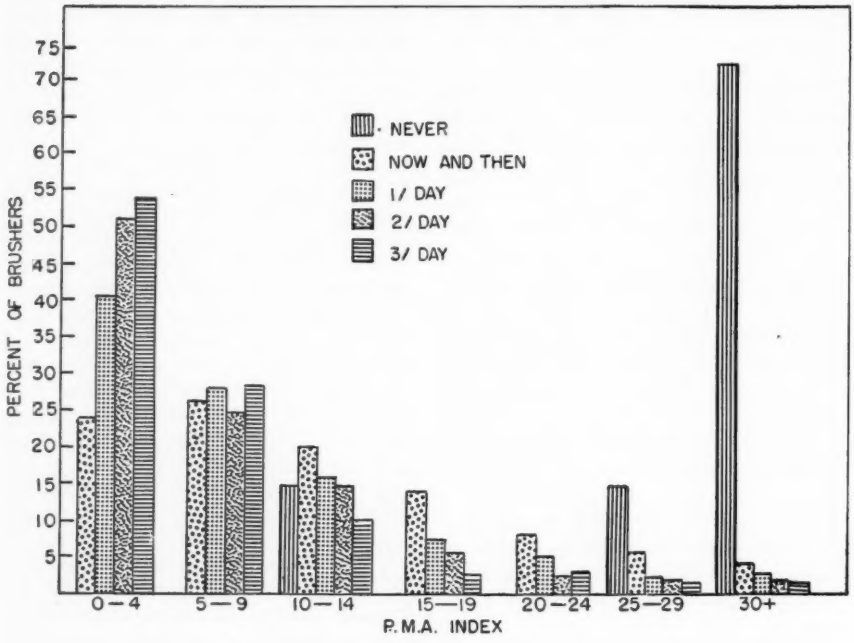
This survey of oral health was made to determine oral soft tissue conditions only. Even though the time of day in which the teeth were brushed was noted and made a part of another paper,[21] for this survey, our interests concerned themselves with the

TABLE 2

Relation of Frequency of Brushing to Gingival Inflammation as Expressed by the P.M.A. Index

Frequency	P.M.A. Index															
	0-4		5-9		10-14		15-19		20-24		25-29		30+		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Never	0	0	0	0	1	14.3	0	0	0	0	1	14.3	5	71.4	7	100
Occasionally	84	23.9	92	26.1	70	19.9	48	13.6	28	8.0	20	5.7	10	2.8	352	100
Once a day	445	40.2	312	28.7	173	15.6	79	7.1	56	5.1	21	1.9	22	2.0	1108	100
Twice a day	641	50.8	309	24.5	183	14.5	65	5.2	32	2.5	19	1.5	13	1.0	1262	100
Three Times a day	184	54.3	96	28.3	34	10.0	8	2.4	10	2.9	4	1.1	3	0.9	339	100

Fig. 1 A COMPARISON OF THE PERCENTAGE OF PERSONS IN EACH BRUSHING GROUP BY P.M.A. INCREMENTS



primary fact that the teeth were or were not brushed, and if brushed, how often per day. The following factors in this group of subjects remained relatively constant: (1) all subjects were rested and in good health; (2) the knowledge of toothbrushing techniques was uniformly general; (3) there was almost a complete lack of the use of additional forms of gingival stimulation; (4) the estimated time spent in brushing fell within very narrow limits; and (5) new toothbrushes were purchased with a good degree of regularity. In view of the constancy of these factors, it is felt that the soft tissue health of these subjects could be directly correlated with the frequency of brushing.

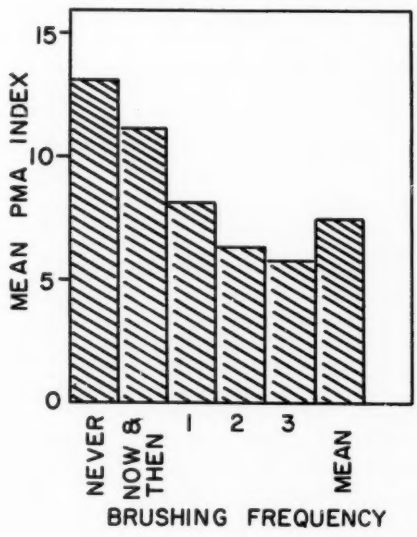
In a previous survey on toothbrushing habits,[21] it was shown that oral cleanliness was directly proportional to the frequency of toothbrushing. Whether or not the presence of gingival inflammation was due to irritation caused by retained foodstuffs or to a lack of brushing stimulation was not determined. It must be presumed that both factors could contribute to an increase in gingivitis and that the simultaneous elimination of these factors can be accomplished through toothbrushing. Both Figure 1 and Table 2 show that with an increase in the frequency of brushing, with the consequent increase in food removal and gingival stimulation, there appears a decrease in the amount of gingivitis.

Statistical analysis of Table 2 illustrated a significant Chi^2 with a $p < .001$. A partial analysis of this table shows that in the PMA 0-4 grouping there is a direct relationship between oral health and toothbrushing frequency as expressed in percentages of the total observed in each frequency. As toothbrushing frequencies increase, the per cent of persons with small amounts of gingivitis increases, and con-

versely, almost all of the non-brushers fell in the PMA 30 + group. A comparison of the *occasional, 1 per day, 2 per day,* and *3 per day* brushers in the 0-4 group shows that only 23.9 per cent of the total of occasional brushers could be placed in this low group, whereas 40.2, 50.8, and 54.3 per cent of the *once, twice* and *three times* a day brushers, respectively, fell in this classification of the least inflammation.

Further, analysis seems to indicate that the span of differences in percentages of

Fig. 2. CORRELATION BETWEEN BRUSHING FREQUENCY AND MEAN PMA



those who do use a toothbrush is greatest between the "now and then" brushers and those who have established a routine of only one brushing a day. Even with the minimum of one routine brushing a day almost 17 per cent more men fall into this low group. The differences between the *one a day* and *two a day* is 10 per cent and the *two a day* and *three a day* is only 3.5 per cent.

The PMA 5-9 group continues to show the same relationship but to a much less degree. In this group of increased inflammatory conditions the differential between the *occasional* and *three a day* brushers amounts to only 2 per cent. As the amount of gingivitis increases through the 10-14 group and up to the 30 + index, the relation of percentages assumes an inverse ratio.

The mean PMA Index of the 3,068 subjects was calculated at 7.47 areas per person. When the mean indices of each brushing group were calculated and plotted, all previous conclusions were supported. Figure 2 illustrates the relationships of the mean PMA Indices for the varied brushing frequencies.

It can readily be seen in the above graph that as the frequency of brushing increases the amount of inflamed area per mouth decreases. This graph also supports the conclusion that the greatest decrease in gingival inflammatory conditions occurs when an individual begins to practice a *daily* oral hygiene routine. It can also be seen in Figure 2 that the advantages enjoyed by those brushing three times a day over those brushing twice a day is relatively small.

These results seem to indicate that gingival tissues respond favorably even to minimal amounts of stimulation and continue to improve in their health, though at a much slower rate, when the frequency of their stimulation is increased. Even though tissue health continued to improve with increased stimulation, the maximum changes seemed to occur with two brushings a day. In those cases where more frequent stimulation was practiced no harm was done but the increase in gingival health was small.

SUMMARY

The response of gingival tissue to the stimulation received from various frequencies of toothbrushing has been measured. Using a rigidly controlled questionnaire in which the natural reluctance and resistance to report deviations in oneself from known standards was overcome, the toothbrushing habits of 3,068 persons were obtained. This

toothbrushing frequency was correlated with the oral gingival health, using the PMA Index as a standard of measurement.

The results of this survey indicate that gingival massage in the form of toothbrushing is beneficial and that there is a significant decrease in gingival inflammation when even the minimum amount of one brushing a day stimulation is employed. The benefits of daily gingival stimulation appear to reach their optimum with two brushings a day. There is an increase in tissue health with more frequent brushing, but benefits derived from this increase are small.

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CINCINNATI DENTAL SOCIETY MEETING

The annual Spring Clinic Meeting of the Cincinnati Dental Society will be held March 16, 17, 18, 19 at the Netherland-Hilton Hotel.

A scientific program including new views on old subjects, combined with lectures in fields only recently added to our literature, presented by nationally famous clinicians promises to make this a notable meeting.

Fibromata of Interest to the Periodontist

by PAUL N. BAER, D.D.S.,* AND ROBERT L. REEVES, D.D.S.,** *Los Angeles, Calif.*

THE fibroma is a common lesion found on the gingiva. However, little attention has been directed towards its diagnosis and treatment by the periodontist. It is the purpose of this paper, therefore, to discuss fibromas which occur on the gingiva, and are intimately associated with the teeth. The term fibrous epulus, has been applied to these by many authors.[1,2] Since the term, "epulus," means literally, "on the gums," the use of this term seems justifiable.

ETIOLOGY

It is generally conceded that local irritation, such as calculus and food impaction, is a predisposing factor. Cases do arise, however, which cannot be satisfactorily explained on this basis.

PATHOGENESIS

These tumors arise from either the mucoperiosteum or the periodontal membrane. Therefore, either fibrous tissue, cementum or bone, can be found in the tumor mass.

CLINICAL DESCRIPTION

The tumor is a benign, painless, slow growing, well-encapsulated mass with a smooth surface. It ranges in color from pale pink to a deep red. The color present depends upon the degree of inflammation and degeneration present, as well as the age. The older lesion is usually more fibrosed, less vascular and therefore, paler in appearance. The attachment may be either pedunculated or sessile, and its size varies greatly, ranging from a few millimeters, to several centimeters in diameter. It is usually found, (1) arising interproximally, but on the buccal or lingual, about the necks of the teeth (Fig. 1); (2) arising from the periodontal membrane between two teeth, passing from labial to lingual, and actually pushing the teeth apart (Fig. 2); (3) arising about the necks of the teeth, but located directly on the lingual or labial (Fig. 3).

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INCIDENCE

It offers a problem in diagnosis at all age levels, as it appears from the first through the seventh decades of life. However, it occurs more frequently in females and is usually located more frequently in the maxilla than the mandible, with no side predilection.[3]

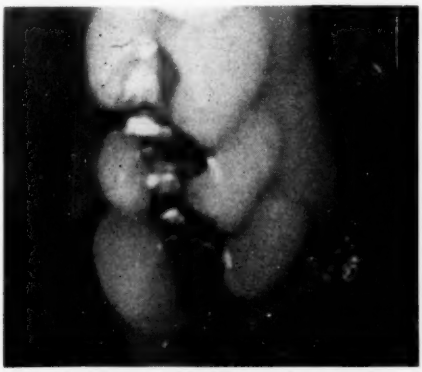

Fig. 1. Fibroma present on the buccal surface of the gingiva between the upper left first and second molars.

HISTOLOGY

The tumor usually reveals a covering of stratified squamous epithelium. In the absence of inflammation, the epithelium is usually atrophic due to the pressure of the underlying connective tissue. However, in the presence of inflammation, the epithelium will often show deep proliferating rete

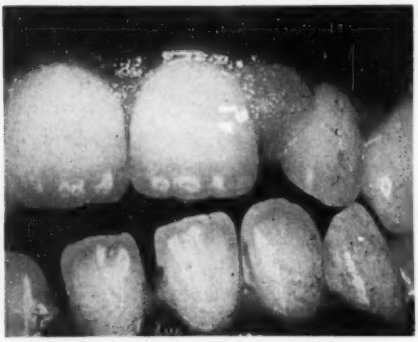

Fig. 2. Fibroma occurring between the upper left central and lateral incisors, causing these teeth to become separated.

pegs, the cells may show hydropic degeneration, and the surface epithelium may be ulcerated. The body of the tumor is composed of bundles of fibrous connective tissue, with occasional ectopic formation of cementum and bone. Inflammatory cells, mainly plasma cells and lymphocytes, may be present in varying amounts, and tend to lie between the layers of fibrous connective tissue and perivascularly. Vascularity, however, is usually not marked. An example of this type of tumor is seen in Figure 4, which is a section of the tumor seen in Figure 1. Histologically, the tumor is seen to be covered with a thin layer of stratified squamous epithelium. In some areas, however, the surface epithelium is ulcerated and the cells show hydropic degeneration. The rete pegs also proliferate deep into the underlying connective tissue. Below these areas, ectopic formation of bone is present, and the connective in these regions contain dense focal accumulations of round cells, mostly plasma cells and lymphocytes, which are located perivascularly, and between the bundles of connective fibers.

Occasionally, the tumor may be composed of fusiform or spindle shaped cells, with very little collagen intercellularly.

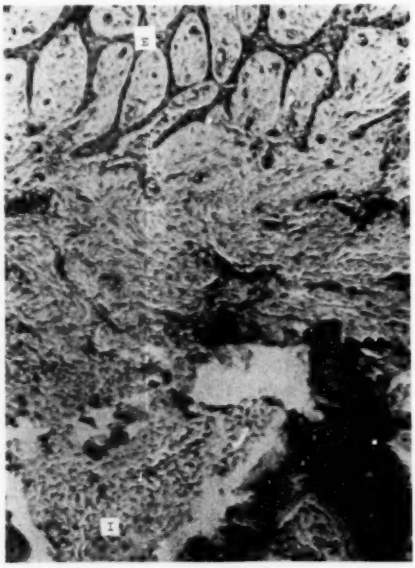

Fig. 4. Photomicrograph of tumor seen in Figure I. E—proliferating epithelial pegs. I—inflammatory cells.

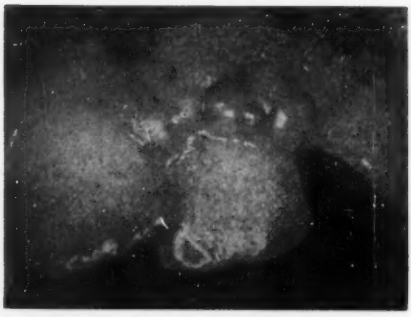

Fig. 3. Fibroma on the labial surface of the upper left central incisor.

Figure 5, which is a photomicrograph of the tumor shown in Figure 3, is an example of this type. Histologically, there is present in this tumor, a small fragment of tissue composed of small cells with spindle shaped nuclei. Some of the cells are arranged around a hyaline aggregate.

TREATMENT

Complete excision of the tumor, with restoration of physiologic and deflecting

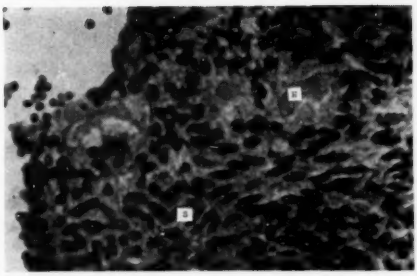

Fig. 5. Photomicrograph of tumor seen in Figure III. H—hyaline material. S—spindle-shaped cells.

contours is necessary, in order to prevent recurrence of the tumor, as well as its complete elimination. Considering the benign nature and non-invasiveness of this tumor, under no circumstance is there justification for the extraction of the teeth adjoining the tumor. If a recurrence should take place, which is unusual, the tumor can again be excised without extracting the adjoining teeth, or tooth, with which it may be intimately associated.

CASE REPORT

Mrs. E. S., age 48, married, caucasian, was referred for a diagnosis. The patient complained of a growth on the upper left buccal region (Fig. 1). She stated that it has been present for approximately five years, of the same size now as then. She experiences no pain and the growth does not bleed. Her personal dentist advised her that she should have a biopsy taken from the growth for diagnosis. She states that her family history is negative to any type of cancer, and her past history is negative to diseases and illnesses. Examination reveals a hard fibrous growth, normal in color, located on the buccal gingiva, in the area between the maxillary left first and second molars. It is approximately 5 mm. in width, and 7 mm. in length, and 4 mm. elevated. It has a pedunculated attachment. Clinical diagnosis: fibroma. Biopsy report: Fibroma, with ectopic bone formation, and focal accumulations of chronic inflammatory cells.

The author wishes to express his appreciation to Dr. Leonard Hural for taking the photomicrographs used in this article.

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UNIVERSITY OF OREGON DENTAL SCHOOL OFFERS COURSE MAY 20-24, 1957

This course, by Frank G. Everett, M.D., D.M.D., M.S., is designed to emphasize the important role of periodontia in the general practice of dentistry.

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A Five Year Longitudinal Study of the Gingival Condition of a Group of Children in England

by GILBERT J. PARFITT, F.D.S., M.R.C.S., L.R.C.P.,* *Birmingham, Ala.*

IN studying the factors which affect periodontal disease, not only is diagnosis of the presence of disease necessary, but an assessment of the severity of disease may also be required. As the structures comprising the periodontium are affected unequally by various conditions, the condition of each structure must be assessed separately. In the present survey only the condition of the gingivae has been observed.

The clinical signs of gingival inflammation are a change in color, an alteration of the surface texture and the presence of swelling. A hyperaemia detected by a change in color is presumed to be inflammatory in origin, for these areas of hyperaemia have been observed to persist over a long period or become the site of a more severe gingivitis in subsequent examinations.

Such a wide range of variation occurs in the clinical condition of the tissues in periodontal disease that it has been deemed impracticable, or impossible, to recognize different grades of severity of disease; but this is not the case if the grades selected are few in number, are chosen on simple, well defined signs and symptoms which differ markedly from one another and which are readily recognized in clinical practice. With practice, reproducible findings are not only possible, but practical agreement between different observers can be accomplished.

Several investigators have formulated a method for the assessment of the degree of severity of gingivitis. King,[1] in 1945, recognized three grades of severity; slight disease, where some swelling of the gingivae without redness occurred; moderate disease, where swelling and pocket formation was present with slight bleeding; and severe disease, where there was a greater amount of swelling and profuse bleeding. Such gradings are not satisfactory. In slight inflammation swelling rarely occurs without redness, three degrees of swelling are not easily recognized and hemorrhage is dependent more upon the presence of ulceration than the intensity of inflammation.

In 1947, Schour and Massler[2,3] in an attempt to introduce a more objective method of assessing gingivitis, evolved an index based on the extension of the inflammation to surrounding tissues. In their assessment the (degree or intensity) of inflammation, above the level which is necessary for the diagnosis to be made, is intentionally ignored. The different anatomical parts of the gingivae recognized were the papillae (P), the marginal gingivae (M), and the attached gingivae (A). The index is the sum of the affected parts and is known as the P.M.A. Index. However, they also attempted a form of severity rating based upon the degree of extension of inflammation from papillae, to margin, to attached mucosa, and recognized four grades of severity of gingivitis; mild, where only the interdental papillae were inflamed; moderate, where the marginal gingivae were also affected; severe, where the attached gingivae were also involved; and finally added a most severe grade where gross swelling, hemorrhage or ulceration occurred. This last grade was therefore, based on the intensity of inflammation and breaks away from their rule of assessment on extension alone.

In clinical tests the P.M.A. Index was not found to be entirely satisfactory. No clear cut demarkation was found to exist between the first three grades of the extension of inflammation from papillae, to margin to attached mucosa. Rarely were papillae inflamed when the margins were not, although the intensity of inflammation

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was often more severe in the papillae. Moreover, the intensity of inflammation varied greatly, presenting a widely different clinical picture without alteration of the P.M.A. Index. It became clear that under some circumstances the intensity of inflammation changed without alteration of the distribution of inflammation and modification of Schour and Massler's P.M.A. Index was necessary if these circumstances were to be studied.

MODIFICATION OF THE P.M.A. INDEX

The main feature of the present modification is an addition of a severity rating to the diagnosis of the presence of gingival inflammation. This method has been tested over a period of eight years and several thousand children and adults have been examined.

The condition of each interdental papilla, margin or attached mucosa on the buccal or lingual surface of each tooth is observed and recorded. The severity of inflammation is divided into five arbitrary levels which are recorded as follows:

O—indicates there is no clinical evidence of inflammation whatever in the area examined.

P., M., or A.—indicates a detectable hyperaemia in the Papilla, Margin or Attached mucosa in the area examined. The level of severity is recognizable by a research worker.

In addition,

One plus (+)—denotes there is also loss of stippling, redness, swelling or bleeding on pressure. This level of severity is recognized in clinical practice as a mild gingivitis.

Two plusses (++)—denote that the severity is such that the patient may complain of symptoms such as, bleeding, sensitivity, itching sensation or tenderness. At this level the patient is generally aware of the condition.

Three plusses (+++)—denote the presence of severe hyperaemia or obvious swelling, or that hemorrhage occurs spontaneously or on the slightest touch of food or tooth brush. This level of severity is recognized in clinical practice as severe gingival disease. Further subdivisions of this group can be made where necessary.

Such a clinical assessment is dependent upon the judgment of an observer but the grades are well defined, are well recognized in clinical practice and differ markedly from one another. Even the grades of detectable and mild gingivitis are, in most instances, well defined. However, as in all clinical assessments borderline cases occur and reproducibility of findings of the same observer or between different observers is not perfect.

In this method the presence of inflammation and the severity of inflammation in each gingival area are recorded separately and the accuracy of one observation is not submerged beneath the inaccuracy of the other; the advantages of each clinical assessment are thus retained.

DATA AND FINDINGS

Children between the ages of two and seventeen years, living in an institution on the outskirts of London, were examined over a period of five years. Not all the children were present for the entire five year period; data were, therefore, from a mixed longitudinal survey. One hundred forty-nine boys and one hundred six girls were present from 12 to 60 months and provided a total of 1,120 examinations.

Each child was examined every six months, one of the examinations being made during the month in which the birthday occurred. Children passing through the active stages of puberty were examined every three months. The same two dentists were both present in all except a few instances when only one was present. A full dental chart was completed at each examination on which the gingival condition was recorded by an assistant without reference to any previous chart. Fifteen minutes were available for each examination.

From these records various assessments have been made and although every interdental area was individually recorded, in this study, the incisal areas have been assessed as single units. Figures 1, 2, 3, and 4, and tables 1 and 2, therefore, relate to the buccal surface of the maxillary incisal segments only.

Figure 1 shows the prevalence of gingivitis on the labial surface of the maxillary

TABLE 1

Severity Scores of Gingivitis in Boys Age 7½, 9½ and 13½ Years

Age No. cases	7½ 22	9½ 30	13½ 29
Score			
0	10	3	1
1	9	18	12
2	2	9	9
3	1		3
4			3
5			1

incisal region for both sexes at each half-yearly age from three to seventeen years. Prevalence is expressed as the percentage of cases with and without gingivitis. All cases are included, and no severity score is involved.

It is seen that the prevalence of gingivitis in this area, which is the one most commonly involved in these children, rises from the age of three to a peak at eleven years, when less than ten per cent of these children are free from clinically detectable hyperaemia. Between eleven and seventeen years the prevalence falls slightly to between 80 per cent and 90 per cent of these individuals.

It must be stressed that the clinical examination and recording of clinical findings is an entirely different and separate process from subsequent evaluations. From the same clinical records any number of different assessments such as severity scores or indices may be made, so long as the recording of the condition at the original examination was sufficiently comprehensive.

TABLE 2

Severity Scores of Gingivitis in 116 Boys and 97 Girls Age 12–14 Years

Score	No. Boys	No. Girls
0	16	18
1	47	34
2	30	28
3	13	9
4	7	5
5	3	3

The severity index of each child was assessed as follows: Of the five interdental areas the one exhibiting the most severe degree of inflammation was used for the assessment. When this area exhibited detectable hyperaemia of either papilla or marginal gingivae and was recorded as P. or M., a score of 1 was given. When inflammation extended to the attached mucosa and was recorded as A. a further score of 1 was given, the recording of P.M.A. scoring 2. Where one, two or three plusses were recorded, denoting the presence of a mild, a moderate, or a most severe gingivitis, a further score of 1, 2, and 3 was given. A recording of P.M.A.+++ scoring 5.

FIGURE 1

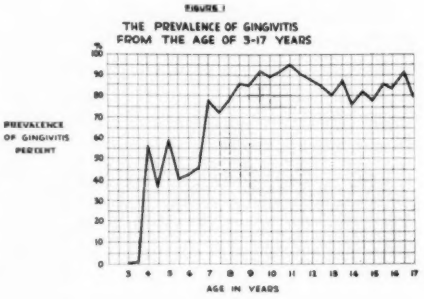


Figure 2 shows the mean severity scores of the inflammation on the labial surface of the gingivae in the maxillary incisal region for both sexes, at each half-yearly age from 3 to 17 years. Only those with gingivitis are included, the severity index, therefore, is above unity. It can be seen that the severity of inflammation rises from the age of 3 to a peak at 13 years when the mean score of nearly two is recorded. A marked decrease then follows, until at the age of 17, the score falls to the level reached by the age of 6 years.

The incidence of gingivitis is a severity index which includes those free from gingivitis, and is expressed as the mean score for all cases. The incidence of gingivitis in the labial surface of the maxillary incisal region, between the age of 3 and 17 years is shown in Figure 3 for boys and Figure 4 for girls. The incidence reaches a peak at the age of 13 or 13½ years in boys, and at the age of 11 years in girls.

The prevalence and severity of gingivitis both rise to a peak at the ages of 11 and 13 years respectively, but thereafter the prevalence falls only slightly, whereas the severity of inflammation falls sharply. The ratio of one to the other changes. It can be seen from table 1 that the severity of gingivitis in boys increases at a greater rate

FIGURE 3

THE INCIDENCE OF GINGIVITIS IN BOYS FROM THE AGE OF 3-17 YEARS

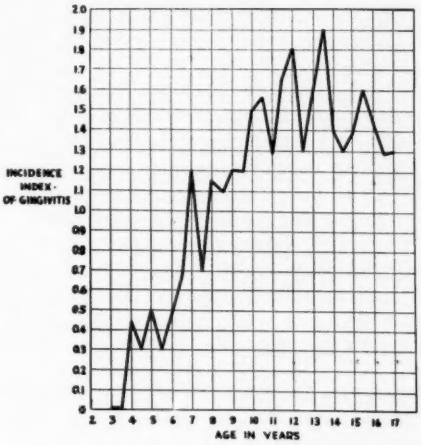
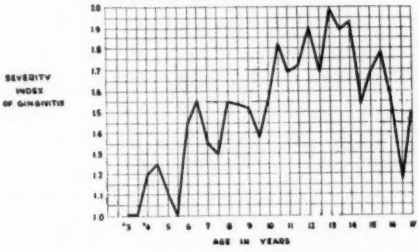


FIGURE 2

THE SEVERITY OF GINGIVITIS FROM THE AGE OF 3-17 YEARS



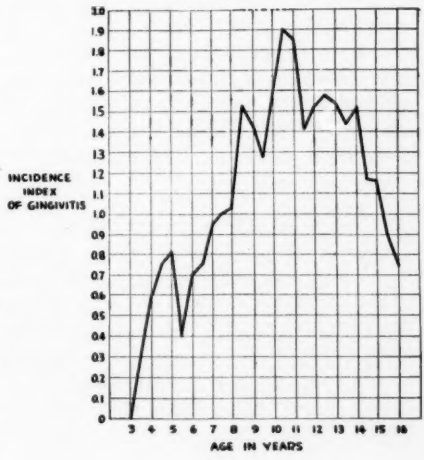
than prevalence, so that at 13½ a greater proportion have the more severe grade of gingivitis. On comparing Figures 1 and 2 it can be seen that after the age of 12 years the number of individuals with gingivitis remains virtually the same, but the intensity of disease diminishes considerably with advance of age to at least 17 years.

The incidence index, which includes the severity rating, reaches a peak value of 1.9 in both boys and girls, although the age at which this is attained is 13½ in boys, and 10½ in girls. After this peak is attained the incidence falls at apparently the same rate in both sexes (Figs. 3 and 4).

King,[1] in 1945, examined children living in the same institution in which the present investigation was made, and reported that the prevalence and severity of gingivitis at the age of 12 to 18 years was greater in boys than in girls, the actual figures, between the ages of 12 and 14, being 79 per cent in boys and 56 per cent in girls. For comparison the severity scores of gingivitis in the present investigation for boys

FIGURE 4

THE INCIDENCE OF GINGIVITIS IN GIRLS FROM THE AGE OF 3-16 YEARS



and girls between the age of 12 and 14 are shown in table 2. Such difference in boys and girls is usually attributed to better oral hygiene being practiced by the girls at this age. But, at the age of 12 to 14 years, the girls have passed the severity peak by two and a half years, whereas the boys are at their highest incidence and this difference is maintained until the age of 16 years or more. Before the age of 12 years the girls show the greater incidence of gingivitis as they reach their severity peak two and a half years earlier than the boys. Such differences in the incidence of gingivitis above and below these critical ages would be difficult to attribute to a difference in oral hygiene habits.

As the greatest incidence of gingivitis in boys and girls occurs at approximately the same time as the onset of puberty, a hormone factor may be responsible. However, only a slight relationship was found to exist between the times of onset of puberty and the beginning of the decline in severity of gingivitis in the particular individuals who were not only passing through the stages of puberty but were present throughout the entire five year period. However, the exact times of onset of these two features are difficult to determine and the numbers are few.

Eruption of teeth has also been suggested as the cause of such incidence peaks of gingivitis in children, but the present data refers to the upper incisor region only and the difference in eruption time of the incisors between these particular boys and girls was only six months and moreover these teeth erupted several years before the peak in gingivitis occurred.

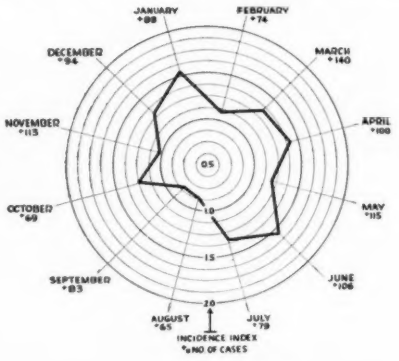
A seasonal variation in gingivitis has been noted by several observers.[4, 5, 6, 7] In Figure 5, the gingival condition of the labial segments of both upper and lower incisal segments are included as separate units for boys and girls of all ages, and the mean incidences for all groups over a period of five years are arranged according to the month during which the examination was made.

The incidence of gingivitis between the months of December and July varies, but the values for August, September, October and November are slightly lower than for the other months.

DISCUSSION

No clinical assessment is entirely free from observational error or of variation between different observers. Although diagnosis of the presence or absence of inflammation is claimed to be a more objective assessment than the recognition of different grades of severity of inflammation, it must be remembered that the clinical judgment of whether inflammation is present or not,

FIGURE 5
THE SEASONAL VARIATION IN THE INCIDENCE OF GINGIVITIS IN BOYS AND GIRLS FROM 3-17 YEARS OF AGE OVER A PERIOD OF 5 YEARS



is also a subjective clinical assessment of a certain degree of inflammation.

The P.M.A. count of Schour and Massler is the most valuable method of measuring the prevalence of gingivitis, for which purpose it was primarily designed, but when prevalence rises to above 90 per cent of individuals and factors affecting the intensity of inflammation are to be investigated, interest is transferred to the severity of disease. Some index of severity is, therefore, of practical importance.

The condition of the gingivae does not indicate the degree of involvement by disease of the deeper structures. But the gin-

givae in many instances are the first structures of the periodontium to be involved and are the only structures of the periodontium accessible to direct vision. Study of gingival disease is, therefore, of considerable importance, particularly if causative factors are under consideration. Gingival conditions before the age of 10 years are of particular interest for after this age the disease is almost universal. In this respect it is of interest to note that the labial aspect of the maxillary incisal region is the first to become involved in these children and is the most severely affected area in the mouth, but that this region is the least common site for calculus deposition.

Although the papillae may show a greater degree of oedematous enlargement and intensity of inflammation than the marginal gingivae, this may well be accounted for by the greater bulk of tissue at the base of the papilla, for there is no fundamental difference in their structure. In the present study as both areas are so commonly involved simultaneously they are considered as one structural unit.

The attached mucosa, however, has different structural characteristics and becomes involved by inflammation at a later stage of the disease. Several observers have based their assessment of gingivitis on the progression of inflammation from papilla to attached mucosa. In the present method of scoring, involvement of the attached mucosa scores one extra point, but this is the only exception to the assessment of severity of disease on the basis of intensity of inflammation. Such extension to the attached mucosa could be separately assessed if need be, for it is recorded separately and a heterogenous assessment would thus be avoided. But as the attached mucosa was only involved in a small number of these children, the values are not greatly influenced by its inclusion in the present instance.

Instead of using the gingivae associated with each tooth as a unit, Brown, et al (1954)[8] suggested that the gingivae of the whole mouth should be considered as a single unit. They also pointed out that one area of the mouth is affected independently of another and that although the anterior gingival segments are the most commonly affected, they are not a true index of the condition in the buccal segment. Schour and Massler suggest restricted examinations to the anterior segments of the mouth under some circumstances, as these areas are the most readily observed.

In these children although gingivitis was commonly localized to the incisal region, in some instances the buccal segments were more severely involved. Upper and lower incisal segments were also unequally affected. This suggests that different factors operate in the different regions of the mouth and in most investigations each of these areas should be separately considered. There is some justification, however, on considering the maxillary or mandibular incisal areas as one gingival unit, for when one papilla or margin was affected all five units were affected in the majority of cases in the children examined.

The method of examination must depend upon the nature of the investigation, for some factors are likely to affect the gingivae associated with an individual tooth, others the gingivae in a segment of the mouth and still others the gingivae of the whole mouth. Examination and recording must, therefore, be fine enough to supply the necessary data.

Examination of children living in an institution has the advantage that the diet and routine of life is regulated, and individual variants, such as dietary likes and dislikes, are under observation. In children living with their parents, these factors are obscure. The disadvantage is that the group is thereby selected and differences may be present between these children and those living at home. In the particular "Children's Home" visited a great effort had been made to simulate normal home conditions. The children are arranged in small groups in separate houses in which they sleep and eat. The food is prepared and cooked in each individual kitchen, although sup-

plied from a central source. These groups are like large families and the brother-sister relationship is encouraged. The similarity to normal home conditions is excellent in comparison to other institutions examined, and one unfortunate measurement of success is that the caries incidence approximates closely to children living at home, in contrast to the low caries rate found in the other institutions.

The degree of accuracy of charting by the present method cannot be assessed by this study as the condition itself is liable to change; but in 881 serial examinations which includes a continuation of this survey, the gingival condition was found to remain remarkably constant or change gradually from one degree of gingivitis to the next. On 387 occasions the condition remained the same; on 385 occasions the condition changed to the next grade of severity above or below; on 93 occasions the condition passed to two grades above or below, jumping the intermediate grade; on 14 occasions two intermediate grades were passed; and on 2 occasions, three intermediate grades were passed over. These figures suggest that the gingival condition changes gradually and the accuracy of charting is of a high order.

SUMMARY

1. An index of gingivitis combining a modification of Schour and Massler's P.M.A. Index and a severity rating is described.

2. A longitudinal survey extending over five years was made of 149 boys and 106 girls living in an institution.

3. The prevalence and severity of gingivitis of these children between the ages of three and seventeen years are presented.

4. The incidence of gingivitis in boys and girls is compared.

5. A slight seasonal variation in the incidence of gingivitis was observed.

ACKNOWLEDGEMENTS

The author wishes to thank Doctor E. R. Bransby of the Ministry of Health, London, Director of the Harpenden Growth Study for permission to publish these findings; and also my secretary, Miss Freda Elvy of the Eastman Dental Hospital, London, who not only recorded the clinical findings but also collected and prepared the data.

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Some Observations on the Microscopic Features of Infrabony Pockets

by FERMIN A. CARRANZA, JR., D.D.S.,* AND IRVING GLICKMAN, B.S., D.M.D.,**
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ALTHOUGH the infrabony pocket† was described early in the literature[1,2] the current revival of interest in this condition justifies further consideration of its microscopic features. Some microscopic observations on serial sections of twelve infrabony pockets obtained from six autopsied human jaws will be presented in an effort to provide basic information which may be drawn upon for the development of treatment technics.

OBSERVATIONS

The pathologic changes in infrabony pockets are entirely comparable to those of suprabony pockets.‡ In varied degrees and combinations, inflammation of the pocket wall, suppuration, proliferation and degeneration of the connective tissue and epithelium, and necrosis of the tooth surface are common to all periodontal pockets. However, there is a pattern of bone loss and arrangement of gingival and transseptal fibers which are features peculiar to infrabony pockets.

The pattern of bone destruction associated with infrabony pockets is such that bone loss occurs in a vertical or angular plane rather than horizontally. As a result it is only beneath the base of the pocket that there is attachment of bone to tooth by periodontal fibers (Fig. 1). The surface of the bone which is adjacent and lateral to the pocket wall has no direct connection with the tooth. The "unconnected" bone surface lateral to the soft tissue wall presents a variety of changes which include osteoclastic resorption, repair of previously resorbed areas and areas of inactivity. A comparable variety of bony changes occurs within the alveolar bone along the endosteal surfaces.

Fig. 1. Infrabony pocket on the palatal aspect of a maxillary lateral incisor. Note the angular pattern of bone destruction. Hematoxylin and eosin. Original magnification X16.

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†This term is used to connote periodontal pockets in which the base of the pocket is apical to the crest of the alveolar bone. These pockets are also referred to by other terms such as "intrabony," "intra-alveolar" or "subcrestal."

‡This term is used to connote periodontal pockets in which the base of the pocket is coronal to the crest of the alveolar bone. Other terms used for this condition are "supra-alveolar" and "supracrestal" pockets.

Fig. 2. Detailed study of area subjacent to the bottom of infrabony pocket shown in Figure 1. Note the newly formed bone in response to tension. Hematoxylin and eosin. Original magnification X120.

In contrast with the lateral bony surface, the bone which is beneath the base of the pocket and is connected to the tooth surface appears to be affected by functional forces as well as by the inflammation in the area. In areas of tension, newly formed bone is often seen subjacent to the base of infrabony pockets (Fig. 2). Areas of pressure are devoid of new bone formation.

The arrangement of the gingival and transseptal fibers associated with infrabony pockets stands out when comparison is made with suprabony pockets. In suprabony pockets the normal arrangement of the gingival and transseptal fibers is maintained by the restoration of new fibers in the area formerly occupied by alveolar bone and periodontal membrane (Fig. 3). However, the formation of an infrabony pocket leads to the creation of a new fiber pattern, with an increased length of the gingival fibers and oblique rather than horizontal transseptal fibers (Fig. 4). In infrabony pockets located interproximally, fibers extend from the cementum beneath the epithelial attachment along the bony surface up to the crest where they divide into two groups, one of which passes over the crest to the cementum of the adjacent tooth (transseptal); the other extends into the gingival papilla (gingival) (Figs. 5 & 6). In labial and lingual infrabony pockets, one group of fibers extends over the bony crest to become continuous with the fibrous outer periosteum of the bone and the other extends into the gingiva (gingival). The fibers present varying degrees of degeneration and destruction depending upon the extent and severity of inflammatory involvement.

DISCUSSION

Our findings are in accord with previous reports[1-4] of an altered arrangement of gingival and transseptal fibers in infrabony

Fig. 3. Two suprabony pockets in an interdental space between the maxillary cuspid and lateral incisor. Note the normal horizontal arrangement of the transseptal fibers. Hematoxylin and eosin. Original magnification X46.

pockets. The arrangement of the fibers so that they form a covering of the alveolar bone, unless they are completely destroyed by inflammation, stimulated conjecture regarding their possible clinical significance. One of the aims in the treatment of infrabony pockets is the obliteration of the angular bony trough by the addition of new bone along the lateral bony surface. The persistence of fibers covering the lateral bony surface might be an impediment to the desired restoration of alveolar bone and its attachment to the tooth. Under such circumstances post-treatment healing might result in the re-formation of an infrabony pocket which conformed to the pre-existent contour of the lateral bony wall.

The changes which occur along the bone surface lateral to the soft tissue wall of

Fig. 4. Interdental space between maxillary lateral and central incisors showing a stage in the formation of an infrabony pocket (left). Note the oblique arrangement of the transseptal fibers and the increased length of the gingival fibers. Masson's stain. Original magnification X46.

Fig. 5. Interdental space between mandibular lateral incisor and cuspid, showing an infrabony pocket (left). The fibers extend from the cementum forming a covering of the bone and divide at the crest into gingival and transseptal groups. Hematoxylin and eosin. Original magnification X16.

infrabony pockets are also of interest. The presence of bone formation as well as bone resorption is not unique to the bone surface in relation to infrabony pockets. The bone surface subjacent to suprabony pockets presents comparable changes. However, the existence of reconstructive activity along the lateral bony surface and along endosteal surfaces within the bone is especially noteworthy in the case of infrabony pockets, in view of the fact that the removal of the lateral bony wall is sometimes advocated in the treatment of this condition.

The condition of the bone beneath the

base of infrabony pockets which is attached to the tooth by periodontal membrane fibers warrants analysis. The bone in this area reflects the nature of the functional forces upon the tooth. In areas of tension there are layers of new bone beneath the base of the pocket which are in marked

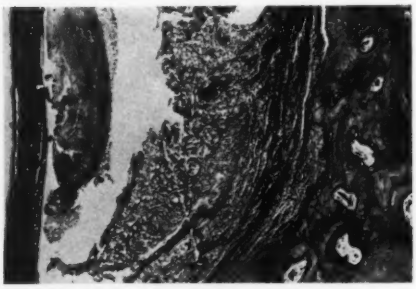

Fig. 6. Detailed study of the infrabony pocket shown in Figure 5. Note the persistence of the fiber pattern along the lateral bony surface despite the degeneration associated with inflammatory infiltration. Hematoxylin and eosin. Original magnification X78.

contrast with the resorption along the bone surface lateral to the soft tissue wall of the same pocket. These findings may be interpreted as suggestive evidence that the natural response of bone to functional stimulation could affect the extent of bone reconstruction following the treatment of infrabony pockets. If there is validity in such an assumption, the attainment of optimal functional environment by occlusal adjustment and the realignment of functional forces by prosthesis would be critical phases of the treatment of infrabony pockets, particularly in relation to the attainment of desirable bone level and contour.

SUMMARY

The microscopic features of infrabony pockets were studied in autopsied human jaws. Patterns of bone loss and fiber arrangement were described as features unique to infrabony pockets and their possible clinical significance was considered.

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WESTERN SOCIETY TO MEET MARCH 29-31, 1957

The Western Society of Periodontology wishes to announce its fourth annual Scientific Meeting to be held at the beautiful Sahara Hotel, Las Vegas, Nevada, March 15, 16, 17, 1957. Dr. Lewis Fox will be the essayist.

Reservations must be made direct with the Sahara Hotel, Las Vegas, Nevada before March 1st, 1957. The registration fee will be $65.00 for participants and $45.00 for wives and non-participating guests. This covers meals and lodging for the period of the meeting and includes two spectacular evening shows. Registration limited to 200 participants.

A Review of the Epidemiology of Periodontal Diseases

by CHARLES M. BELTING, B.A., D.D.S., M.S.,* *Chicago, Ill.*

IT has long been recognized that periodontal disease in the adult is the cause of the loss of more teeth than any other dental disease. Also, the relationship of periodontal disease to systemic illness has been demonstrated and referred to repeatedly in the literature.[1,2,3,4,5,6] Currently, the aging trend of our population and the promising advances in caries control will result in more people reaching the age when the gross, damaging effects of periodontal disease are manifest. These facts, together with recent additional evidence[7,8] of the high incidence of periodontal diseases in large samples of the adult population in the United States, emphasize the challenge that further epidemiological study of these diseases presents to the dental profession in general, and to the public health agencies in particular.

The controlled studies of the fluoridation of public water supplies in Newburgh, New York; Evanston, Illinois and elsewhere, represent the finest cooperative contributions to public health that the dental profession has ever developed. The over-all reduction of dental caries in our population now appears possible with the further adoption of the fluoridation of communal water supplies. The success of these projects was dependent, however, upon the development of a workable index of measurement for caries by Klein and Palmer[9] in 1938. Up to the present time, there have been no uniform criteria of assessment for the measurement of periodontal diseases, and until there is agreement on this basic consideration, little or no reliable statistical data on the epidemiological characteristics of periodontal diseases can be ascertained, nor can the effects of any control procedures adopted, be measured. Advancement in our knowledge of the periodontal disease process has now reached a point where the development of standardized criteria for its measurement is critically needed. Epidemiological research is necessary for a further understanding of this disease process and will open the way to new methods of investigation.

It is the purpose of this discussion to review those methods of measurement for periodontal diseases that have been used, to analyze the morbidity rates that have been reported, and to suggest the intensification of public health efforts toward the development of a uniformly agreeable method of measurement for the further epidemiological study of periodontal diseases.

From the Dental Training Center, Veterans Administration West Side Hospital, Chicago, Illinois.

Presented before the Midwinter Meeting of the American Association of Public Health Dentists, Chicago, Illinois, February 5, 1956.

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METHODS OF MEASUREMENT

Since it is the intention of this review to deal with those periodontal diseases which are manifest by loss of alveolar bone supporting the teeth, references to gingival diseases are omitted. A thorough review of the literature on the subject of gingival disease is contained in a report by Day[10] in 1951.

By Tooth Loss. Brekhus,[11] in a report published in 1929 on the causes of tooth loss, challenged the effectiveness of modern dentistry by pointing out that human beings are losing more than 50% of their teeth by the age of 40 years. Dentistry may have improved this situation somewhat in the last 36 years, for in 1955 Day and others[8] report that 50% of teeth are not lost until the age of 50 years instead of 40 years. The major cause for this loss after the age of 35 years was found by Brekhus to be due to periodontal disease. At the age of 70 years, 61% of all teeth extracted in men was due to periodontal disease alone.

These astounding findings have now been a matter of record for 36 years. (See Fig. 1).

It is not proposed that a study of the epidemiology of periodontal disease be conducted by recording tooth mortality rates alone, but it is necessary to know the mortality rate of a disease, as well as the morbidity, before the attack rate can be defined.

By Roentgenographic Analysis. The first report in the literature by Black[12] in 1918 on the morbidity rate of periodontal disease was based upon a roentgenographic analysis of 600 random outpatients, age 20 to 50 years and over, in the Chicago area. The sample included 300 dental students, 50 Dental and Medical Reserve Corps Officers, 50 private patients and 200 patients seeking admission to Northwestern University Dental School. All areas showing roentgenographic evidence of bone destruction along the sides of the roots were classified as periodontal "infection." Clinical oral findings were not included in the study.

Somewhat later, Sheppard[13] reported a noteworthy contribution to the scientific analysis of roentgenographic evidence of periodontal disease. In attempting to show the relation of periodontal disease to diabetes mellitus, he measured the amount of resorption of the interdental alveolar septum by dividing the root length in degrees of 0 to 10 where 5 indicated that half the alveolar support of the tooth was gone and 10 indicated that resorption had occurred to the apex of the root. A resorption figure was then given to each of six areas in the roentgenograms; namely, the four posterior and the two anterior areas. A resorption score thus could be assigned to each case by adding the figures given to each of the six areas. Since Sheppard's sample population was a highly selected group of only 67 patients hospitalized for diabetes mellitus, his findings are not usable as a measure of the incidence of periodontal disease.

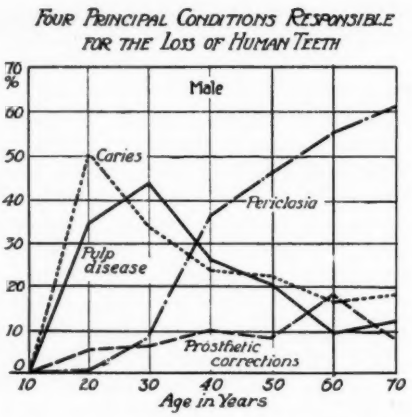

Fig. 1. (From Brekhus, J.A.D.A. 16:2237, 1929).

A modification of Sheppard's method of roentgenographic analysis was used by Miller and Seidler[14] in 1940, in a study on the correlation between caries and periodontal disease. The material studied consisted of the dental roentgenograms of 1003 unselected patients reporting for treatment at New York University College of Dentistry. The roentgenograms were divided into four areas instead of six; namely, upper right and left, and lower right and left areas. The amount of resorption in each area was scored by dividing the root length in degrees of 0 to 5 where 3 indicated half the alveolar support was missing, and 5 indicated loss of all alveolar support to the apex of the tooth. The sum of the resorption figures given to each of the four areas was referred to as the "alveoloclasia index."

Using the foregoing method of analysis in 500 full mouth roentgenograms selected at random at New York University College of Dentistry, Miller and Seidler[15] described the pattern of attack of periodontal disease on the various teeth. It was found that the incisors and maxillary molars were most susceptible and usually were attacked first. Next in order of susceptibility were the mandibular first and second molars, while the cuspids, bicuspids and mandibular third molars were least susceptible and usually were last to be attacked.

A further significant classification of the roentgenographic changes seen in periodontal disease was made by Miller and Pelzer[16] in 1939, in which the interdental septum and alveolar crest were divided into five types. The first type was described as "normal" in which there was uniform density of the interdental septum and a continuous lamina dura over the crest of the septum. The second type showed a marginal widening of the periodontal membrane space with a concomitant narrowing or thinning of the lamina dura. The third type was considered as "arrested bone destruction" with characteristics the same as in type 1, except at a lower level. The fourth type was considered as "slow bone destruction" which differed from "normal" by the absence of the lamina dura over the crest of the septum. The fifth type, called "rapid bone destruction," had no lamina dura over the crest of the septum and showed a radiolucency of the septum increasing toward the crest.

The above classification of periodontal changes seen in the roentgenogram were not used by Miller and Pelzer on an epidemiologic basis, however. They simply reported on the basis of many case histories that it was possible to distinguish roentgenographically the activity of alveolar bone resorption.

In 1949, a combination of the foregoing methods of roentgenographic analysis of periodontal changes was used with some modification on an epidemiological basis, in a carefully analyzed study by Day and Shourie[17] in India. The dental roentgenograms of 568 police and civilians, mostly male, were examined. No exposure of upper posterior areas was made for some cases because of a lack of film. The bone resorption of each interdental septum was graded from 0 to 10. The sum of the resorption figures given to each septum, divided by the number of septa, resulted in a resorption score for each individual. The roentgenogram also was graded as slow, rapid or arrested resorption.

In 1955, Day and others[8] reported an additional epidemiological survey of periodontal disease of 1,279 individuals in the Boston area, age 13 to 65 years. The methods used in this study were similar to those used in the previous roentgenographic study reported by Day in 1949 with several notable additions. The survey included a clinical examination which recorded the incidence of recession, pocket formation, calculus, and tooth loss, in addition to the roentgenograms. The criterion used for assessment of the presence or absence of periodontal disease was the roentgenogram, however, not the presence of pocket formation. In other words, "an individual was considered as having chronic destructive periodontal disease if there was roentgenographic evidence of destruction of the alveolar bone surrounding one or more teeth," while the incidence of pocket formation and recession were considered as findings quite apart from a diagnosis of "chronic destructive periodontal disease."

By Clinical Examination without Roentgenograms. Two additional epidemiological surveys, one by Schwartz[18] in East Africa and another by Dawson[19] in Egypt were reported in 1946 and 1948 respectively. Each study was based on a clinical examination without the aid of roentgenograms. The Schwartz study was based upon the examination of 408 tribal people, ravaged by disease, under conditions probably not ideal. Periodontal findings were rather obscurely classified into two categories; (1) teeth with no looseness and pockets 1/10 of an inch or less in depth, and (2) teeth with noticeable looseness and "deep" pockets. The Dawson study consisted of 994 malnourished, chronically ill, agricultural workers admitted to the Abbassia Fever Hospital. Periodontal diseases were classified according to five categories; (1) marginal gingivitis, (2) hypertrophic gingivitis, (3) ulcerative gingivitis, (4) marginal periodontitis and (5) periodontosis syndrome. The degree of involvement was graded according to pocket depth; 0.1 to 2 mm. indicating mild, 2-3 mm. medium, and greater than 3 mm. severe involvement.

By Correlation of Clinical and Roentgenographic Findings (Disease Diagnosis). It is surprising that all the foregoing reports on the prevalence of periodontal disease omitted consideration of edentulous persons in the statistical evaluations. Any random selection of the adult population must include some edentulous people. The question then arises of how to score such persons from the standpoint of periodontal disease, not knowing with certainty the cause for the tooth loss. It has been shown by Brekhus that the major cause for tooth loss after 35 years of age is periodontal disease. It seems reasonable, therefore, to include such persons in the statistical evaluations as having been attacked by periodontal disease after the age of 35 years. With this thought in mind, a study was made by Belting, Massler and Schour[7] in 1953 on the prevalence of periodontal disease in 5,014 nonhospitalized, male, war veterans in Chicago. The study was based upon a clinical examination with the aid of a 14 film set of roentgenograms for each patient. Each individual was classified in one of four categories; (1) normal, (2) periodontitis simplex with horizontal bone resorption, (3) periodontitis complex with vertical bone resorption, or (4) edentulous.

MORBIDITY RATES OF PERIODONTAL DISEASE

The morbidity rates of periodontal disease shown in Figure 2 show considerable variation. This variation is due largely to the different criteria of assessment used in these studies, although there were undoubtedly some differences peculiar to the sample populations examined. Two patterns of consistency are present in the curves of incidence represented, however. First, all the curves reach their peak somewhere between the ages of 40 and 50 years of age; and second, the age of onset appears to be somewhere between 10 and 15 years of age.

Roentgenographic Studies. It will be noted that the roentgenographic studies indicate a higher incidence of disease than the clinical studies. The highest incidence shown is that of the India study which recorded 100% of persons affected by 17 years of age. The method of roentgenographic analysis for this study was the same as that used in the Boston study, so it must be assumed that the difference in the two is due to inherent differences in the sample populations examined. The two samples were of entirely different racial background as well as nutritional state.

The lowest incidence shown, for the roentgenographic studies, is that of the Chicago study by Black in 1918, which recorded a peak incidence of 88% of persons affected by the age of 50 years and over. The method of roentgenographic analysis used in this study was not as clearly defined as in the later studies; nor is it likely that the roentgenograms of this era possessed the sharpness of detail as those of a later date. These facts would tend to explain the lower incidence in this study as compared to the other roentgenographic studies.

It is of particular interest to note that the curves of incidence for the New York and Boston studies parallel each other very closely, each showing a peak incidence of 97% to 98% of persons affected by the age of 40 to 45 years of age. Each of these roentgenographic studies, by different authors, employed similar methods of analysis for sample populations that were closely related ethnically, socially, and geographically. It would appear from this evidence, therefore, that the methods of roentgenographic analysis used in these studies result in reproducible or comparable data for epidemiological purposes.

Clinical Studies without Roentgenograms. The study in East Africa based upon the clinical presence of pocket formation without the aid of roentgenograms, shows the lowest incidence of disease of all the studies reported. The peak incidence of 30.46% of persons affected is reached at the age of 40 years and over. The reasons for this low incidence are not entirely clear. One would expect the incidence to be

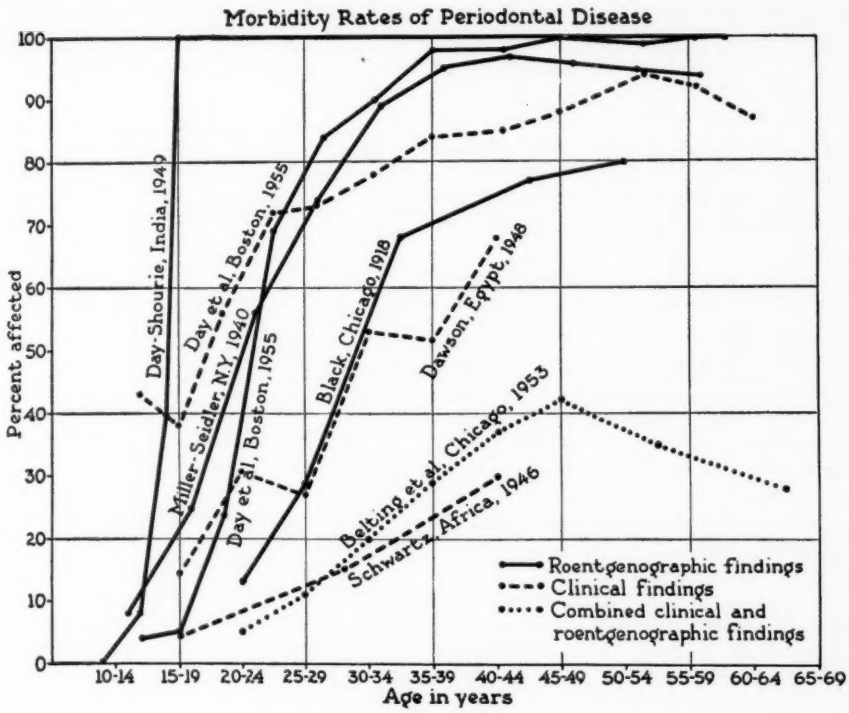

Figure 2.

higher in a sample population of tribal people ravaged by disease. However, there is little doubt that the examinations were conducted under conditions not ideal, and clinical surveys of this type, unsupported by roentgenograms, could easily overlook the presence of periodontal pockets and bone resorption.

Using the figures for marginal periodontitis and periodontosis syndrome in the Egyptian study, it will be seen that the curve of incidence reaches a peak of 67.9% persons affected at age 41 and over. This is a considerably higher incidence than that reported for the East Africa study, and may be the result of a more severely diseased sample population together with more ideal conditions of examination.

The other clinical survey, based upon the clinical presence of periodontal pockets, 3 mm. or greater in depth, reported in the Day study in Boston shows a markedly higher incidence than either the East Africa or Egyptian studies. The peak incidence of pocket formation, 94% of persons affected, occurs at 52 to 55 years of age. This high incidence is even more disconcerting when the clinical incidence of pocket formation is compared to the roentgenographic incidence of bone resorption in the same Boston study. It will be noted that pocket formation was present in 43% of persons examined at 13 to 14 years of age, whereas roentgenographic evidence of bone resorption was present in only 4% of those examined. Conversely, at age 46 to 48, pocket formation was present in 88% of the cases while roentgenographic evidence of bone resorption was present in 100% of the cases. The clinical presence of pockets on the labial and lingual surfaces of the teeth, not detectable in the roentgenogram, might explain a higher

clinical than roentgenographic incidence of disease in the younger age groups, but the lower clinical than roentgenographic incidence of disease in the older age groups would seem to indicate that the roentgenogram shows alveolar bone changes suggestive of periodontal disease in about 12% of the cases where it actually does not exist clinically, since the disease exists only rarely without pocket formation.

Combined Clinical and Roentgenographic Study. The Chicago study by Belting and others, based upon a criterion of "disease diagnosis" from a combined clinical and roentgenographic analysis, shows a peak incidence of 42% of persons affected at 45 to 49 years of age after which the curve of incidence declines gradually due to the increase of edentulousness as age advances. Omission of edentulous persons, as was done in all the other studies, yields a peak incidence of 48% as compared to 42%. Since all the evidence was available in this study to make a diagnosis of periodontal disease, namely, a clinical examination supported by the presence of roentgenograms at the time of examination, it is difficult to explain the markedly lower incidence of this study as compared to the roentgenographic studies. Several explanations might be proposed, however. First, the sample population examined consisted of recently discharged war veterans for whom considerable dental treatment had been provided by the Armed Services. It is entirely possible, therefore that the prevalence of periodontal disease in this sample was less than it would be in a random population not so treated. Second, all veterans, having been screened from a health standpoint prior to induction into service, could be expected to have less systemic disease than a population not so screened. Third, three of the four dentists who collected the data for this study were not trained periodontists. It is possible, therefore, that these three dentists overlooked the earlier stages of the disease as it is the tendency of many general practitioners to do. And fourth, the Boston study has demonstrated how roentgenographic findings, when considered apart from clinical findings of pocket formation, result in a 12% higher roentgenographic than clinical incidence of disease.

If the first three foregoing factors did influence the data in this study, the curve of incidence would have reached a higher level for a sample population where these influences were not present, but the fourth factor would indicate that roentgenographic evidence of disease will always be greater than clinical evidence.

DISCUSSION

It is apparent from the foregoing observations that the problem of arriving at a satisfactory criterion of assessment for the epidemiological study of periodontal disease is a complex one. Ideally, a criterion based upon "disease diagnosis" in which the examiner correlates clinical and roentgenographic findings at the time of examination would be most suitable, since this is the method employed by the clinician in arriving at a plan of treatment for a patient. But practically, this method is beset with many handicaps for epidemiological purposes. First, there is lack of agreement among the best of clinicians on the interpretation of the various clinical and roentgenographic findings seen in periodontal disease. And second, as a result of this lack of agreement, no uniformly acceptable classification of periodontal diseases has been developed. The Committees on Nomenclature of the American Academy of Periodontology and the American Dental Association have done much to clarify this problem, but our present knowledge is insufficient to eliminate the variable factor of subjective interpretation in any method of assessment based upon "disease diagnosis." Until there is a clearer understanding of the etiology and pathogenesis of periodontal diseases, epidemiological data based upon "disease diagnosis" will not lend itself to accurate reproducibility.

The roentgenogram, therefore, seems to be the most objective tool available at the present time for epidemiological study, in

TABLE #1

YEAR	AUTHOR	METHOD	MATERIAL	FINDINGS
1918	Black	Roentgenographic analysis of 10 film full mouth x-rays.	600 outpatients, age 20 to 50, in Chicago.	Morbidity rate of alveolar bone disease increases from 13% affected at 20 to 24 yrs. to 88% affected at 50 yrs. and over.
1929	Brekhus	Record kept of reasons for 13909 extractions i.e. caries, pulp involvement, periodontoclasia, impaction, cyst, accidents, orthodontic, prosthetic and supernumeraries.	2723 outpatients, age 10 to 70, reporting for extraction at Univ. of Minnesota Dental Clinic. 13909 extractions.	Loss of teeth from periclasia starts at 20 yrs. and increases to 61% in men and 50% in women at 70 yrs. Loss of teeth from caries drops from a high of 50% at 20 yrs. to 18% at 70 yrs.
1936	Sheppard	Roentgenographic analysis, bone resorption measured in degrees of 0 to 10. Mouth divided in six areas and resorption figure given to each area.	67 hospitalized patients with diabetes mellitus.	Some resorption starting at 15 yrs increasing to severe resorption at 40 yrs. Moderate to severe thereafter.
1939	Miller & Pelzer	Roentgenographic analysis alveolar bone classified as normal, marginal widening of PDM, arrested, slow and rapid bone destruction.	Many case histories number not specified.	Conclusion made that it is possible to distinguish activity of alveolar bone resorption roentgenographically.
1940	Miller & Seidler	Roentgenographic analysis. Bone resorption measured in degrees from 0 to 5. Mouth divided in 4 areas and resorption figure given to each area.	1003 outpatients, age 11 to 60 at New York University College of Dentistry.	Morbidity rate of alveolar bone disease increased from 9% affected at 11 to 15 yrs. to 97% affected at 41 to 45 yrs. 62% of males as compared to 56% of females needed periodontal treatment.
1942	Miller & Seidler	Roentgenographic analysis. Bone resorption measured in degrees from 0 to 5.	500 patients, age 10 to 60 and over, selected at random at New York University College of Dentistry.	Pattern of attack of alveolar bone disease occurs in following order: group 1, incisors and upper molars; group 2, lower first and second molars; group 3, cuspids, bicuspids and lower third molar.
1946	Schwartz	Clinical examination without roentgenographs. Pocket depth 1/10" or greater and looseness of teeth used as criteria.	408 Masai, age 14 to 40 and over, in East Africa. A pastoral, tribal people ravaged by disease.	Morbidity rate of alveolar bone disease increases from 5.6% affected at 20 yrs. and under to 30.46% at 40 yrs. and over.
1948	Dawson	Clinical examination without roentgenographs. Pocket depth measured and graded as slight, moderate or severe. Alveolar bone disease identified as marginal periodontitis and periodontosis syndrome.	994 hospitalized, malnourished chronically ill, agricultural workers, age 15 to 55, in Egypt.	Morbidity rate of alveolar bone disease increases from 14.3% affected at 15 - 20 yrs. to 67.9% affected at 41 yrs. and over. Periodontosis greatest at 36 to 40 yrs.
1949	Day & Shourie	Roentgenographic analysis. Bone resorption measured in degrees from 0 to 10. Each septum graded. Summation of grades divided by areas examined gives resorption figure.	568 civilians and police mostly male in India.	Morbidity rate of alveolar bone disease increased from 8.33% affected at 13 - 14 yrs. to 100% affected at 17 yrs. and over. 65% showed horizontal resorption, 35% vertical resorption.
1953	Belting, Massler & Schour	Correlation of clinical and roentgenographic findings using four categories of diagnosis: normal, periodontitis, periodontosis and edentulous.	5014 outpatient, male, war veterans age 20 to 80 in Chicago.	Morbidity rate of alveolar bone disease increased from 5% affected at 20 to 24 yrs. to 42% affected at 45 to 49 yrs. Edentulousness increased from 2% at 30 - 34 yrs. to 38% at 70 - 80 yrs.
1955	Day, Stephens & Quigley	Roentgenographic analysis using degrees of resorption from 0 to 10. Clinical recordings made of recession, pocket formation, suppuration, tooth mobility and tooth mortality.	1279 males and females, age 13 to 65, in Boston.	Morbidity rate of alveolar bone disease increases from 4% affected at 13 - 15 yrs. to 100% affected at 46 yrs. and over. 50% of teeth lost at 50 yrs.

spite of its many limitations. Certainly the roentgenogram has the advantage of providing a permanent record which can be analyzed by some type of scale which will eliminate subjective interpretation. This is an important consideration in any survey technique.

There are hazards in the use of the roentgenogram when omitting a clinical examination, however. Improper angle of exposure, variations in tooth anatomy, stage of eruption, and inclination of the teeth[20] can all give an erroneous appearance of periodontal disease when not supported by a clinical examination. There is little doubt that these factors have contributed toward the extremely high morbidity rates reported in the roentgenographic studies.

It must be recognized, that the roentgenogram is only a tool, and although it reveals variations in the trabecular pattern, density, and height of alveolar bone, these variations may not necessarily be an indication of the presence or absence of periodontal disease on a cross sectional basis, without clinical verification. These variations are meaningful when related on a longitudinal basis to a case history, but no scientific report has yet established their usefulness on a cross sectional basis.

Also, it is well known that physiologic recession or atrophy of the alveolar bone occurs in many instances without the development of periodontal disease, especially in the older age groups. Some method of scoring these cases would be desirable in order to eliminate them from a "disease" classification. The "arrested" classification proposed by Miller and Pelzer might provide a solution to this problem.

No method, sufficiently refined or standardized, has yet been developed that will enable an examiner to interpret roentgenographic findings, unless they are supported by clinical findings, without being subject to a large margin of error. The next objective in the development of epidemiological methods for the study of periodontal diseases, therefore, would appear to be a standardization and refinement of roentgenographic methods already used. Such findings should be reported as alveolar bone changes, however, not as diagnoses of periodontal disease.

The studies cited in this review have established the high world-wide prevalence of periodontal disease. Although none of these reports has come from the public health agencies, the public health dentist is the logical specialist to carry forward this research as he has in the field of caries. Two courses of action appear to be indicated; first he should develop an educational program directed toward the public in general and the dental profession in particular to stimulate more adequate recognition and treatment of this insidious disease process, and second, he should solicit the cooperation of the American Academy of Periodontology in arriving at an agreeable criterion of assessment for further epidemiological study of this disease on a nation-wide basis. Racial, sex, endemic and dietary differences may thereby be found which will provide valuable clues to its etiology.

SUMMARY AND CONCLUSIONS

1. The epidemiology of that class of periodontal diseases characterized by alveolar bone destruction has been reviewed (Table 1).

2. Four methods of measurement have been used in the epidemiological study of periodontal disease; (1) by tooth loss, (2) by roentgenographic analysis, (3) by clinical examination, and (4) by roentgenographic analysis correlated with clinical examination.

3. There is wide variation in the reported prevalence of periodontal diseases due primarily to lack of uniformity in the methods of assessment used, and secondarily to inherent differences in the sample populations examined.

4. There are two patterns of consistency in the reported morbidity rates of periodontal disease; (1) the age of onset occurs

between 10 to 15 years, and (2) the peak incidence is reached between 40 to 50 years of age.

5. Roentgenographic analysis, as a method of epidemiological assessment of periodontal disease, appears to have the greatest potentiality of providing reproducible or comparable statistical data.

6. Roentgenographic findings, when used according to the methods of analysis thus far described, indicate alveolar bone changes in about 12% of cases in which pocket formation does not exist clinically.

7. Since periodontal disease constitutes a major public health problem, the public health dentist is the logical specialist to conduct further research on its epidemiology.

8. Further useful epidemiological research on periodontal disease is dependent upon the development of a standardized method of assessment.

9. Concurrence upon a standardized method of assessment can best be accomplished through the coordinated effort of the public health agencies and the American Academy of Periodontology.

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Orthodontic Procedures in Periodontal Therapy

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FREQUENTLY in the management of periodontal disease, orthodontic procedures serve as useful aids in periodontal therapy. Many abnormalities of occlusion may be corrected by occlusal equilibration but there are some cases which in spite of any amount of selective grinding that might be done, cannot be termed successful until orthodontic procedures have been accomplished. Orthodontic procedures for correcting minor malpositions of the teeth can oftentimes be effectively carried out by the general practitioner.

One must be cognizant that orthodontic treatment is a slow procedure and that its primary function is improvement and not perfection.[1] Further, that such treatment is divided into two parts:

1. Active Stage: When appliances are actually moving the teeth into the desired positions.

2. Passive Stage: When the teeth are not being moved but are supported and retained in their new positions by appliances or when they stay in their newly acquired positions without mechanical aid.[2]

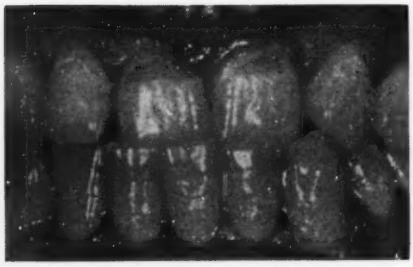

Fig. 1. Patient with linguoversion of maxillary central incisors. Note inflammation of marginal gingival tissues around central incisors and also at the attachment of the labial frenum. Compare with Figure 3.

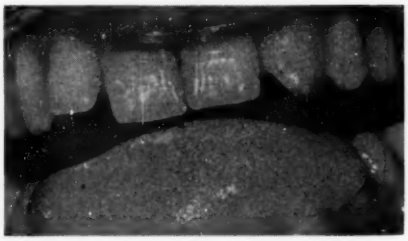

Fig. 2. Appearance of case with self-curing acrylic splint in position. Acrylic is not molded over the teeth immediately after mixing, but delayed so as to permit loss of heat from exothermic reaction of acrylic while it is setting. Patient experiences only a slight sensation of warmth when acrylic is applied.

For the labial movement of maxillary incisor teeth when they are in linguoversion the author has used successfully the application of self-curing acrylic resin adapted directly in the mouth over several of the teeth in the opposing arch. It is very important to have sufficient teeth covered by the acrylic splint so that during the course of treatment the teeth included within the splint will act as a firm anchorage. The patient is then instructed to apply

Fig. 3. Patient after completion of treatment. Note reduction of inflammatory reaction; compare with Figure 1.

The opinions and assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

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Fig. 4. Case before treatment with maxillary left central incisor in linguoversion and maxillary left lateral in torsiversion.

pressure to the tooth or teeth to be moved, by closing the mandible. The only point of contact when the mandible closes must be on the tooth or teeth intended to be moved and on the acrylic splint. As the splint is checked periodically, additional acrylic is added to compensate for the orthodontic movement occurring during the active stage and thus maintaining adequate pressure upon the tooth or teeth to be moved. The length of time to effect the complete movement is dependent upon several factors among which are the age, cooperation of the patient, and the degree of movement needed. This may vary from two to three weeks or longer.

When the active stage has been completed, the splint is removed and the resulting over-jet and over-bite of the teeth that have undergone orthodontic movement, to those which oppose them, is sufficient to maintain the maxillary incisors in their new position. These natural supports

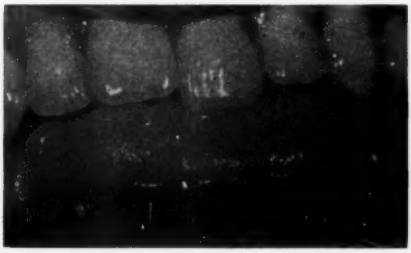

Fig. 5. Patient with acrylic splint in place and mandible closed. Pressure is applied to left maxillary central incisor forcing tooth in labial direction.

in the form, size, and number of teeth are sufficient to maintain the maxillary teeth in their passive stage without the need of retaining appliances.

Figure 1 shows a patient, age 21, in which the maxillary central incisors are in linguoversion. As seen in Figure 2, an acrylic splint made from self-curing acrylic was placed over a sufficient number of mandibular teeth so as to act as a firm anchorage. When biting pressure was applied, the maxillary central incisors were moved labially. Figure 3 represents the completed case with the maxillary central incisors no longer in linguoversion and maintained in their passive stage by the

Fig. 6. Case showing improvement in patient's appearance after orthodontic movement and selective grinding have been completed.

mandibular teeth when they are in contact with the maxillary teeth.

Figure 4 shows a patient, age 24, with the maxillary left central incisor in linguoversion and the maxillary left lateral incisor in slight torsiversion. Figure 6 shows the finished case after the orthodontic movement has been completed and the occlusion adjusted for function and esthetics.

The application of orthodontic procedures is an important and vital adjunct to therapy in the management of periodontal disease. The use of self-curing acrylic resin to effect orthodontic movement as outlined in this discussion is, as we know, only one of many methods used to

move teeth. One of the disadvantages of this method is the partial loss of mastication while the splint is being worn. However, after 24-48 hours the patient usually becomes adjusted to this new situation and is then influenced to apply pressure in an attempt to shorten the time necessary for wearing the splint. The splint cannot be removed by the patient, but on occasion the splint must be replaced as it will work loose prior to completion of treatment. Generally, however, it is necessary for the operator to remove the splint when the orthodontic treatment has been accomplished.

In the two cases shown in this report there can be seen a marked improvement not only in the esthetics and function, but also, periodontally. There has been a decided reduction of inflammation in the gingival tissues immediately surrounding the teeth involved and also of the attachment of the labial frenum as shown in Figure 1. The arrest of incipient periodontal disease has been accomplished effectively by means of orthodontic movement which has established a better relationship of over-jet and over-bite.

The advantages of this method are mainly its simplicity; the application of the splint directly in the mouth, adjustments made by the addition of acrylic to the original splint, and the simple removal of the splint at the termination of treatment without necessitating the use of retaining appliances during the passive stage of orthodontic treatment.

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2. Ibid.

CALIFORNIA ACADEMY OF PERIODONTOLOGY ELECTS NEW OFFICERS

The California Academy of Periodontology (United States Section ARPA Internationale) elected new officers for the year 1957

Earl Gilmore, D.D.S., President

Robert L. Roseberry, D.D.S., First Vice President

Jean P. Cantou, D.D.S., Second Vice President

James J. Pfister, D.D.S., Third Vice President

Alexander M. August, D.D.S., Corresponding Secretary

R. Earl Robinson, D.M.D., Recording Secretary

Elmer G. Smith, D.D.S., Financial Secretary

Clarence E. Butler, D.D.S., Treasurer

V. John Culliber, D.D.S., Editor Academy Review

RESEARCH PRIZE OFFERED BY ARPA

On the proposal of Prof. F. Gomez Jara in 1953, the "ARPA Internationale" decided to create a special fund to finance the "Prize Dr. h.c. René Jaccard," for the best original research concerning periodontal diseases. Since this date, money has been collected and a charter established and adopted by the "ARPA Internationale" in 1955. The award consists of a medal and a diploma. The Jury is composed of six members. The Prize shall be awarded for the first time the 11th September 1957 at the celebration of the XXVth Anniversary of the creation of the "ARPA Internationale," during the XIIth International Dental Congress in Rome.

The Conditions for entering the competition are as follows:

(a) Any original scientific work concerning the periodontal diseases published or performed between 1955 and 1957 can be sent in.

(b) It is not necessary for the author to be a member of the ARPA.

The papers shall be sent, by registered post, in six copies, to the President of the ARPA Internationale (Prof. A. J. Held, Institut Universitaire de Médecine Dentaire, 30 rue Lombard, Geneva, Switzerland) at latest 1st of Mai, 1957.

The laureate (or laureates) will be elected before the 31st July 1957 and the prize (or prizes) shall be delivered at the ceremony of the XXVth Anniversary of the Foundation of the ARPA Internationale.

CHARTER OF THE "PRIZE DR. H.C. RENÉ JACCARD"

1. The fund of the "Prize Dr. h.c. René Jaccard" is constituted by voluntary contributions from the Sections or members of the ARPA Internationale (A.I.) as well as by gifts from persons, organizations or enterprises wishing to show their interest in the A.I.
2. The prize is meant to encourage scientific research in the field of periodontal diseases and specially to reward, every two years, the best work (or the two best works) published in the interval of two ARPA meetings, with a medal and a diploma.
3. The prize does not necessarily go to a member of the ARPA.
4. A Jury composed of five or six members named every two years by the steering committee of the A.I. proposes the laureate (or laureates). The president of the A.I. belongs ex-officio to the Jury and directs the debates.
5. The definite choice of the laureate (or the laureates) is made by the executive board of the A.I. The medal and the diploma are presented at the closing meeting of the international congress.
6. The members of the Jury choose the scientific subjects worthy of particular attention and inform the president of the A.I. Any author of a scientific paper may send it to the president and compete for the prize. The president of the A.I. together with the secretary general ask for five or six copies of this communication and send them to the members of the Jury who will give their appreciation concerning the value of the work. The best work (or the two best works) will be the one (or the two ones) which will obtain the majority. In case of even votes the president has the casting vote. To be valuable the suggestions or inscriptions have to be sent to the president of the A.I. five months before the international congress at which the prize will be delivered.
7. The funds of the prize will be administered by the executive board of the A.I. which decides each time the amount to be accorded.
8. This charter was accepted by the general assembly of the A.I. at the XIVth meeting in Venice (1955).

For the executive board of the ARPA Internationale: Prof. Arthur Jean Held, President; Jean Matthey, D.S., Secretary General.

N.B. The six members of the Jury designated in Venice (1955) are: The President of the A.I., Prof. A. J. Held (Geneva); Prof. H. Becks (San Francisco); Mrs. Prof. A. Chaput (Paris); Prof. K. Häupl (Düsseldorf); Prof. F. Gomez Jara (Madrid); Prof. H. Stones (Liverpool).

Annual Reports . . .

President's Address—1956

by ROBERT G. KESEL, D.D.S., M.S., *Chicago, Illinois*

It is my pleasure to extend to all of you a most cordial welcome to this Forty-Second Annual Meeting of the Academy of Periodontology. I appreciate the honor and the privilege you have given me of presiding over the oldest national academy in dentistry.

I wish to review with you briefly the great challenge that is facing the specialty of Periodontology. It is greater now than ever before because of:

1. *Our rapidly growing population.* United States Census figures show an increase of over 33,000,000 people in the last fifteen years—an increase of between two and three million each year.[1]

2. *Increasing longevity with attending geriatric problems, including dental service.* In 1900 the life expectancy was 47 years. It has risen approximately 4 years for each census period since then, so that in 1950 the average life span had reached 68 years. The percentage of people who reached the age of 65 in 1953 compared to those who attained that age in 1900 is revealing. For white males the increase was 64 per cent, for white females 79 per cent, for non-white males 146 per cent, and for non-white females 156 per cent. The average life expectancy for a non-white female in 1900 was 33 years. In 1953 it had risen to over 64 years.[2]

3. *The diminishing ratio of dentists in proportion to increasing population.* It has been estimated from United States Census figures that in 1930 on a nationwide basis there was one dentist for every 1,750 inhabitants. By 1952 this ratio had diminished to approximately one dentist per 1,900 inhabitants. During the past year, the 43 dental colleges in the United States graduated less than 3,000 (2,996) dentists. From one-half to two-thirds of this number were needed to replace the dentists who died or retired from active practice during the year. If the current trend of population growth continues, and if the annual graduation of dentists is not greatly increased, it is calculated that by 1975 the ratio of dentists to population may drop to one for every 2,500 inhabitants.[3]

4. *The success attained in caries control.* There is good evidence that the fluoridation of a large part of the nation's water supply will preserve many teeth for longer adult use and will bring them into that period when they become increasingly vulnerable to loss through periodontal disease.

5. *Dental health educational programs and improved economic conditions.* These factors are increasing public demand for dental service. It is time that we consider how we can meet this greater challenge and plan our course of procedure. Obviously, the best solution lies in prevention health education and much more remedial care for children.

Numerous surveys have indicated that half the American people by the age of 45 are wearing or should be wearing at least one complete or partial denture: this indicates a tragic defeat for dental service. It is widely recognized that the major cause of tooth loss beyond the age of 30 is periodontal disease. This audience, I am sure, realizes the

chronic nature of most periodontal disorders; the inception occurs long before it is necessary to remove a tooth. The predominating early symptom is a gingivitis, usually caused by a local irritant which triggers a chain reaction resulting in tooth loss. The local condition is usually one that is amenable to treatment if it is diagnosed early and if proper therapy is applied. Yet, the surveys show that from 60 to 90 per cent of our children have some form of gingivitis, most of which goes unrecognized and untreated.

The Federal Government is becoming increasingly aware of the dental problem and as a result this year has appropriated over $6,000,000 for dental research—an amount ten times greater than previously budgeted for any one year. A large measure of credit must be given to our Past President, Doctor Harry Lyons, now President-Elect of the American Dental Association, for the masterful manner in which he presented dentistry's case to the congressional committees. The Academy sent telegrams to key members of the Senate and the House of Representatives urging passage of these bills, and our messages received appropriate replies.

Our Committee on Research must and will take a keen interest in the research projects that will be financed by this expanded research budget. A fair portion should go toward research in the prevention of periodontal disorders, for with the control of dental caries gradually becoming a practical reality, periodontal disease will become our number one problem. I recommend that our Research Committee contact the proper authorities with the request that it be apprised of the projects that are undertaken with these research grants, that it review these projects and include a report on them at our next annual meeting. Likewise, I suggest that our Research Committee lend its help in every feasible way as consultants and otherwise in the development of expanded research in periodontology.

In undergraduate dental teaching more emphasis must be placed on preventive practices. The primary purpose of dentistry should be the retention of natural teeth and not their replacement. Yet, the pattern that dental education has followed introduces the dental student to the fabrication of dentures in the prosthetic laboratory early in his educational program. Preventive therapy has come much later, and too often has a minor place in the curriculum. This sequence, it seems to me, puts emphasis in the wrong place in the student's inexperienced mind. Preventive practices and dentistry for children must command much more time and attention than they have received.

Dentistry rightly desires to be recognized as a health science based on biological knowledge. The greater preservation of natural teeth will do much to attain that goal and to eliminate the still prevalent belief that dentistry is principally a mechanical skill dependent on technical training. The retention of more natural teeth is the best ultimate solution to the problems that have been created by the illegal practice of dentistry by laboratory technicians. This dilemma, which is now receiving considerable attention, even to the spending of large sums of money by some dental societies, will grow greater because of increasing need and diminishing dental personnel. It may well be a losing battle under prevailing conditions. The solution certainly does not lie in continuing to rear more adult cripples and then attempt to care for their accumulated need.

While tremendous gains have been made in dental education, we have not yet reached the level of balance that the importance of preventive dentistry deserves. My belief is supported by the fact that only three state board licensing examinations require a candidate to demonstrate his ability to scale and polish teeth. These states are Kansas, North Carolina, and Utah. In Michigan a prophylaxis can be given in lieu of an amalgam filling. All boards require the candidate to show his proficiency in some type of denture prosthesis, and many of them are now requiring the extraction of one or more teeth. Licensing

boards should be as interested in a candidate's ability to detect and to remove calculus deposits as they are in his ability to remove and replace teeth. Such recognition would help to place this therapy in correct perspective relative to the rest of dental practice.

The Council of this Academy at its February meeting adopted a resolution to the effect that the American Academy of Periodontology vigorously recommends to all state boards of examiners that candidates for licensure be required to demonstrate their ability to recognize and remove supra and subgingival deposits on the teeth as an essential qualification for the practice of dentistry. I suggest that the Committee on Education follow up this resolution with efforts to have the state boards include scaling and polishing in their practical examinations. Members of this Academy should, if desired, volunteer their services as consultants to state boards for assistance in the conduct of such examination.

For some years the Council has discussed means of interesting dental students in the science of periodontology. At one time, a cash prize was offered for the best paper submitted by a student on this subject. All dental schools were informed of this prize. It was found advisable to discontinue this opportunity because so few papers were submitted to the judging committee.

It has been suggested that a student subscription rate be established for our Journal. A survey of students in several institutions revealed that there would not be sufficient interest to justify the attempt. A plan to prepare a special student issue, to be sent free of charge to all fourth year dental students also has been discussed. The proposal has not been adopted because it would be expensive, and more importantly, because many students treat lightly the give-away publications that they receive.

Our fine Journal, with its well edited manuscripts, has a great potential for interesting dental students in periodontology. I suggest that the Council consider asking the head of periodontology in each dental college to submit the names of three students who have shown the most proficiency in periodontology during their first three years of study. Each of these students would be sent our Journal free of charge throughout his senior year. I believe these students would take pride in receiving the Journal as a reward for excellence and I also believe that such a program would create additional interest in other class members.

If we are to broaden the scope of periodontal service and improve the health of our population, we must depend more on auxiliary personnel, particularly the dental hygienist. Since much periodontal disease begins at an early age and is caused or aggravated by neglect, the role of the hygienist in health education and preventive treatment assumes increasing importance. More and more people, particularly children, should receive careful training in proper oral hygiene. The hygienist is qualified to undertake this important task.

There are now thirty-three schools of dental hygiene in the United States. One new school will begin operation on October first. In 1955-56 882 hygienists were graduated. This number is pitifully small compared to the need, particularly when we consider that approximately 800 retired from active practice during the year.[4] Thus, the net gain in hygienists last year was less than one hundred. There were twice as many applicants for hygienist training as present facilities could accommodate, despite the lack of any organized program to interest young men and women in this field. I emphasize the interesting of men in this area because it need not be one restricted almost exclusively to women, and attrition owing to early retirement might not be as great among men. This Academy should redouble its efforts to procure more training facilities and more interest for this important arm of our practice.

With the need for more effective prevention of periodontal disease so apparent, we must recognize that the practice of prevention is based on lay education. The public must have more understandable information about the prevalence, the cause, the treatment, and the prognosis of periodontal conditions. There has been a dearth of such information directed into lay channels in comparison with the amount disseminated concerning dental caries.

During the past year an excellent pamphlet entitled "They're Your Teeth—How Long Will You Keep Them?" was published by the Bureau of Dental Health Education of the American Dental Association with the approval of this Academy. It contains factual information in lay language about periodontal disease; it should be distributed widely, and even republished in popular magazines. The pamphlet is the first issued by the Bureau on this subject; it is to be hoped that it is the beginning of a long series.

PUBLIC EDUCATION DESIRABLE

In his Presidential Address last year Harold Ray recommended the creation of a standing committee of the Council that would be charged with the responsibility of fostering good relations through continuing programs of public education. Means would be sought for disseminating desirable health information through the various channels of communication, including TV, radio, and magazine articles. An amendment to our By-Laws proposing the creation of such a committee will come before our assembly Saturday morning. I heartily support this amendment. Let us consider the tremendous opportunity for public service that its creation would afford our Academy in the popular medium of television alone. This committee could explore the possibility of getting educational material before the public, not only on the educational channels and at odd times when not many are watching or listening, but during the popular programs as well, when millions are viewing. I have good reason to believe that some of the large manufacturers who subsidize television and radio so heavily could be interested in substituting factual and educational information for some of the often misleading and repetitious commercials now used. For instance, a half hour program usually has three periods for the sponsor and his product. Some advertisers, if properly approached, might be induced to utilize one of these periods for a truly educational message; and if the public knew this was a policy they might continue to watch instead of hurrying off to do some of their chores while the commercial is on. Authentic material could be prepared for easy public understanding by writers employed by the manufacturer, with the agreement that the authoritative source remain anonymous if desirable. It is estimated that television has now reached 35,000,000 homes and that more than 99 per cent of all families live in areas served by TV signals. It has become a potent educational medium, particularly during the time when millions are viewing. Dentistry should examine the possibility of injecting concise, factual health information into this and other media, and I should like to see our Academy, through a Committee on Public and Professional Relations, take the lead in this direction.

The problem of membership in our Academy has long been a concern of its officers. If more and better periodontal care is to be provided it can only come about by interesting and educating more general practitioners in this field. That has been and will continue to be an aim of this Academy. Our membership cannot remain static in these times of challenge and expanding needs. This aim cannot be realized merely by increasing the number of members in the organization. Much more can be accomplished by a group of selected individuals of rich experience working together in harmony, combining their beliefs and their wisdom. Membership in the Academy has not and never should come easily. The right to membership should be earned. Only the accomplishments of the

nominee should establish his right to that classification. In the past, membership in the Academy has come only by invitation. This year the Council has seriously considered whether or not to change this procedure to one whereby anyone who wishes to be considered for membership could write to the Secretary for an application form. I was at first inclined to favor the latter plan because I know that many invitations to membership in the past have been extended because the candidate initially expressed to one of our active members a desire for membership. I can, however, visualize the tremendous task that would develop for our Secretary and for the Membership Committee if any dentist were free to apply. There are too many "joiners" who have no expectation of taking a constructive part in the activities of an organization, even to the extent of attending meetings. What comes easily, perhaps with only the payment of dues, is not fully appreciated. I believe it would be best to follow the policy of membership by invitation only, and that nominees should be recommended by members who know them before they are screened by the Membership Committee.

The past year has been a most pleasant experience for me. As my predecessors have pointed out, there is little for the President to do because of the efficient organization of the Academy and the competence of the officers and the committeemen. I am grateful to each Committee Chairman and to each Committeeman for his diligence in discharging his several duties. Because of their initiative and conscientious service, in my estimation, the affairs of the Academy have progressed smoothly. The several committees responsible for this meeting have prepared a program, accommodations, and entertainment that will make our attendance profitable and pleasant.

I must especially commend and thank our Secretary, Clarke Chamberlain, his assistant, Lorrie Hill, and our Treasurer, Jim Aiguier. Their counsel, based on experience, sound judgment, and loyal cooperation, has been invaluable to me. The Academy is indebted to them for the efficient, friendly and understanding manner in which they conduct its affairs.

In conclusion, may I again emphasize the challenging problem with which we are faced. We now have available the knowledge that makes possible great progress in meeting this challenge. Our Academy is composed of men well qualified to lead the profession in this area. Let us bend every effort to keep moving forward with all feasible speed.

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President's Address Report

The committee on the Presidential Address Report wishes to commend President Kesel on a thoughtful report to the membership in which he has carefully analyzed the future problems facing the American Academy of Periodontology.

Doctor Kesel has made an excellent analysis of the public health problems facing dentistry in general and periodontia specifically. The committee on the Presidential Address Report urges the research committee to carry out the recommendations of the President and to encourage the U. S. Public Health Service to channel a maximum proportion of the newly available funds into periodontal research.

The recommendations of the President regarding undergraduate education are in accordance with the basic principles justifying the existence of the Academy and are of paramount importance to public health. We, therefore, recommend that the education committee keep annually corrected records of the status of both the curricula and faculty of the periodontology departments of the various dental schools in order that suitable recommendations from time to time may be presented to the Council and the membership to encourage and assist in the improvement of undergraduate education and to education and to encourage the development of additional teachers in periodontology. Similar information should be kept in a current status regarding the departments of dental hygiene to guide the Academy in the encouragement of these divisions.

The recommendations of the President regarding State Boards should be pursued vigorously toward the goal that each state in the Union incorporate periodontology in both the theoretical and practical examinations for state licensure in dentistry.

The award of the Journal of Periodontology should encourage interest in undergraduate periodontal education, and we recommend that the Council make available three award subscriptions to senior students of the various dental schools in accordance with the President's suggestions.

The need is critical for improved public relations and education of the general public in preventive dentistry. It is urged that a special committee be appointed to investigate the possibilities of use of public service and such other television and radio time as might be made available for periodontal education as recommended by the President.

The committee congratulates President Kesel on having so wisely guided the American Academy of Periodontology during the past year and expresses the appreciation of both the membership and the committee for the excellent suggestions for the future guidance of the Academy.

COMMITTEE ON PRESIDENT'S ADDRESS
S. Leonard Rosenthal
Arvin Mann
Perry A. Ratcliff, Chairman

Atlantic City, New Jersey
September 29, 1956

REPORT OF THE COMMITTEE ON CLASSIFICATION AND NOMENCLATURE*

by JOSEPH L. BERNIER, D.D.S., *Washington, D. C.*

Your committee on classification and nomenclature has pursued its deliberations in the area of nomenclature and at this time wishes to present what it feels is a proper listing of terms together with their definitions.

These data have been predicated upon the classification submitted by this committee in its report of 1954 and 1955, a copy of which is attached to this report.

It is obvious that the committee has not concerned itself with all terms in use since many are manifestly inaccurate and confusing.

The committee members have discussed each term and definition at length and while there are minor points about which we would like to discuss further, still we can report essential unanimity of opinion.

This committee wishes to present its reports of 1954 - 1955 and this present effort for Academy acceptance in 1957. Because of the complexity of these matters we would appreciate receiving comments on the classification and terms being suggested from the Academy membership. These will be carefully analyzed before preparation of the final report. Please forward your comments to the Chairman: Colonel Joseph L. Bernier, Armed Forces Institute of Pathology, Walter Reed Army Medical Center, Washington 25, D. C.

INFLAMMATION

Gingivitis: Inflammation of the gingiva. (See definition of gingivae) Appropriate adjectives are indicated to describe the dominant clinical features such as:

a. Chronic
b. Acute
c. Chronic papillary
d. Necrotizing
e. Fibrotic
f. Desquamative
g. Ulcerative
h. Bullous

Gingivitis associated with recognizable local or systemic causes labeled with appropriate term or terms such as: pregnancy—puberty—menopause—dilantin—avitaminosis—tuberculosis—leukemia, etc.

Periodontitis: Inflammation of the periodontium (see definition of periodontium) involving and extending beyond the gingiva, may be designated—

a. Primary (simplex) when an obvious sequellae to gingivitis and—

b. Secondary (complex) when secondary to retrogressive changes or specific diseases such as leukemia.

DYSTROPHY

Occlusal Traumatism: A traumatic force or forces to a tooth or teeth sufficient to produce traumatic injury to the periodontium. The resultant traumatic injury being called periodontal traumatism.

*Given September 26, 1956.

Periodontal Disuse Atrophy: Alteration in the periodontium resulting from disuse.

Gingivosis: A generic term for diseases of the gingivae in which degeneration is dominant.

Periodontosis: A generic term for diseases of the periodontium in which degeneration is dominant.

ADDITIONAL TERMS AND DEFINITIONS

Alveolar Process: The cortical and cancellous portions of the maxillary bones surrounding the teeth. The periodontal fibers are embedded into the cortical portion which roentgenographically is designated lamina dura.

Alveolus, Dental: The socket in the alveolar process in which the root or roots of a tooth is held by the fibers of the periodontal membrane.

Alveolar Crest: The thin margin of compact bone forming the coronal edge of the alveolus.

Gingiva: The fibrous tissue and overlying epithelium (mucous membrane) which covers part of the alveolar process of the upper and lower jaws and surrounds the necks of the teeth. It is divided into free and attached portions.

Gingiva, Free: The thin border of the gingiva which rests against the tooth cervix. Its inner surface lines the gingival sulcus and is normally in contact with the enamel in youth or the cementum in older individuals.

Gingiva, attached or Alveolar: The portion of the gingiva attached to the cementum and alveolar process. It extends from the free gingiva to the mucogingival junction.

Interdental Papilla: That part of the gingiva that fills the interproximal space between two adjacent teeth, consisting partly of attached and partly of free gingiva.

Gingival Sulcus: The shallow space around a tooth bounded on one side by the surface of the tooth and on the other by the epithelium lining the free gingiva. The term designates the normal condition as distinguished from the gingival and periodontal pocket. At the bottom of the sulcus is the epithelial attachment.

Sulcular (sulcate) Epithelium: The epithelial lining of the sulcus.

Epithelial Attachment: That portion of the gingival epithelium which is attached to the tooth surface from the bottom of the gingival sulcus for a variable distance apically. On the enamel this is the reduced enamel epithelium and on the cementum is produced by proliferation of basal cells apically on the cementum.

Cementum: A specialized calcified tissue of mesodermal origin, a modified type of bone covering the anatomic roots of the teeth.

Periodontal Membrane: The fibrous tissue that connects the cementum of the tooth to the surrounding structures.

Alternative: Periodontal ligament.

Periodontium: The investing and supporting tissues surrounding the tooth, namely the periodontal membrane, the gingiva, the alveolar bone and the cementum of the tooth.

Stomatitis: Inflammatory diseases of the mouth which are not confined to the periodontium.

Periodontal Disease: A generic term designating all periodontal disturbances.

Periodontal Abscess: Acute purulent exacerbation of a chronic periodontitis, associated with deep periodontal pockets.

Gingival Pocket: The gingival pocket may be defined as a pathologically deepened sulcus.

Periodontal Pocket: Pathologically deepened sulcus extending into the former periodontal membrane apically to the original level of the resorbed alveolar crest. The early stages are not sharply differentiated from the advanced stages of a gingival pocket.

Gingival Recession: Progressive exposure of the root surface by apical shift of the gingiva, following resorption of the alveolar crest and loss of the corresponding part of the periodontal membrane.

Resume of Papers Presented at Meeting of American Academy of Periodontology Atlantic City 1956

Prepared by HAROLD RAY,* D.D.S., M.S., *San Francisco, California, and* A. LEIGH WALLACE,† D.D.S., *San Francisco, California*

The forty-second meeting of the American Academy of Periodontology was directed toward the clinician with a resultant stimulus to the members and guests. The following abstracts were prepared in the interest of projecting the impact of our annual meeting to the entire membership. They must be looked upon as "on the scene reporting" which is subject to possible error and misinterpretation by the writers. An honest attempt, however, has been made to report the actual papers, realizing some of the attendant difficulties of a large audience, distractions and so on. Comments, labeled as such, following the individual papers are the writer's own opinions and not those of the author of the paper reported; they are injected as clarification and to stimulate individual thought.

Etiology of Periodontal Disease

by HENRY GOLDMAN, D.M.D., *Boston, Mass.*

Dr. Goldman tackled the very elusive problem of etiology of periodontal disease by stressing the fact that in most instances it is a variable complex and depends upon the incidence and location of the lesion. He remarked that in general periodontists were apt to

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see only the trees in relation to the whole problem rather than the forest. Many kodachromes were demonstrated, illustrating various aspects of the local irritational problem, but it was unfortunate that the accompanying roentgenograms were not also demonstrated. Dr. Goldman presented a very interesting formula which was: the local environmental factor x intensity x frequency x duration, modified by repair = the character of the lesion. He used this formula in demonstrating many specific cases to illustrate the combination of factors responsible for periodontal disease.

Dr. Goldman emphasized the importance of crown form and arrangement along with faulty contacts as being contributory factors in the presence of other factors consummating the lesion. He also pointed out again the problem of fibrosis in the gingiva as a result of inflammation, correlating this feature with the close proximity of repair to the inflammatory process and illustrating it as part of the etiology in the extension of the disease.

He mentioned the consideration of frenum attachments and other muscle pulls upon the attached gingiva and the importance of the study of habits, in relation to the production of the clinical lesion. Dr. Goldman closed with the emphasis on the whole of the problem and that periodontal disease does not occur in any one way.

COMMENTS: It is good to note that our thinking along the lines of etiology is being directed toward the complexity of factors producing periodontal disease in diversified reactive individuals rather than the desperate attempt to pin it to any one cause. The question often asked, "What is the etiology of periodontal disease or the why of periodontal disease" might be better stated by the statement of the whys of periodontal etiology. With the gathering of experience the periodontist learns that the criteria of his evaluation of therapeutic procedures amounts to a continued learning process. This means that each patient presents a different combination of known factors and their relation to each other and the host is such that the results of treatment can only be evaluated in relation to the entire formula. The clinical symptom or lesion of periodontal disease is the same for almost every patient and yet the factors precipitating it are different. The salient feature that comes to mind is the unique relationship of biologically active tissues, such as the connective tissue, bone and epithelium, to biologically inactive tissues of the tooth, primarily the cementum. This relationship makes it difficult to apply the principles of healing and repair that are true of other tissues in the body to it and therefore equally difficult to evaluate the result of injury and tissue reaction. Our one objection to Dr. Goldman's formula is the omission of the systemic reaction of the host and its variability in the equation.

Therapeutic Root Planing

by FRANK M. WENTZ, M.S., PH.D., D.D.S, *Chicago, Illinois*

Dr. Wentz presented a paper which was essentially on the design of instruments for root planing. He has spent a good deal of time in studying this problem and his ideas were worthy of consideration. The summation of this paper is rather difficult to present without the illustrations that were used as part of the lecture. Your attention is called to this work when published. Dr. Wentz was of the opinion that thick handles for root planing are desirable and emphasized the principle that the working end of the instrument should be consistent with the long axis of the handle. This is a matter of proper contra angulation which is a tried principle in most dental instruments. He felt that curettes should be primarily used for the soft tissue side of the pocket and that hoes, sickles and files are the instruments to be applied to the hard tissues. He felt that the sickle was best for the bottom of the pocket but that the files also, if used judiciously, are effective in this area. He pointed out that the files are difficult to clean and to keep sharp and that unless the corners were properly prepared they would have a tendency to do damage. The need for a proper explorer to evaluate the effectiveness of root planing was illustrated and the need for specific design to meet the requirements of the variation

in surfaces to be treated was reiterated. This paper was a good evaluation of our present armamentarium in this particular therapeutic technique and was presented very well.

Discussion

by FREDERICK J. HALIK, D.D.S., *Rochester, N. Y.*

Dr. Halik in discussing this paper took issue with the title "Therapeutic Root Planing" and felt that anything that one does in the treatment of periodontal disease is essentially therapeutic and therefore there is no necessity to apply the adjective. If we remember correctly he suggested root scraping as being just as significant. Dr. Halik presented several pictures before and after curettage which were pertinent in demonstrating the effectiveness of this technique.

COMMENTS: There seems lately a tendency for periodontists to fall into their ancient quagmire of quibbling over terminology. To use the term root planing as a separate entity from subgingival curettage accomplishes only the greater confusion within our literature. The term subgingival curettage of necessity entails root planing as well as the curettement of the soft tissue side of the lesion. It is impossible to plane or curette properly the surface of the tooth in the periodontal pocket without curetting the soft tissue side and the operation is best performed by the operator applying his attention to both facets of this therapy at the same time. It is possibly true that instruments can be specifically designed for each of the facets but to speak of them as separate entities is a mistake. It was good for Dr. Wentz to call our attention to some of the shortcomings of our instruments in relation to the planing of the surface of the roots as well as specific instruments for the treatment of the soft tissue. We must be realistic in our approach and recognize the limitation of any instrument in reaching inaccessible areas of the root surface when handicapped by the tortuous path of the pocket, the complication of the soft tissue, the root anatomy and the inhibitory presence of adjacent teeth. Dr. Wentz's statement that root planing requires dexterity is putting it mildly.

Subgingival Curettage

by ERWIN M. SCHAFFER, D.D.S., M.S.D., *Camp Pendleton, California*

Dr. Schaffer restricted his discussion of subgingival curettage to its effectiveness in producing reattachment of the epithelium and connective tissue in the pathologic pocket. He further restricted his discussion to a consideration of the effectiveness of this therapeutic device in the instance of the infra-bony pocket. He presented a very excellent movie on the technique of obtaining new attachment of these tissues with some excellent slides pertinent thereto. The operation consists essentially of removing the epithelial lining of the pocket and also the granulomatous tissue with thorough and vigorous planing of the root surface side of the lesion. Dr. Schaffer pointed out the biologic factors that were necessary in order to obtain success, such as the complete removal of the epithelium and its restriction in its downward growth during healing. He also stressed the importance of obtaining and maintaining a good blood clot which he checks carefully during post operative procedures. He mentioned that in the interests of access and prognosis of these cases a partial gingivectomy was often indicated, in which the papilla is removed and the procedure of subgingival curettage followed. Dr. Schaffer's slides of diagrams of the reattachment operation aided in clarifying the technique to the audience and his post operative x-ray pictures substantiated somewhat his contention in the direction of success.

Discussion

by ABRAM COHEN, D.D.S., *Philadelphia, Pa.*

Dr. Cohen suggested the term supra and infra-crestal as more desirable terms than infra-bony for the kind of lesion Dr. Schaffer was discussing. Dr. Cohen suggested the

use of a perforated foil as post operative packing as part of the technique for this operation and he also suggested the use of a needle to demonstrate the extent of lateral wall involvement in these pockets.

COMMENTS: The topography of the infrabony pocket presents the most ideal circumstance necessary to the success of reattachment therapy. In this lesion one third to one half of the blood clot, subsequent to operation, can be surrounded by bone from which its biologic organization can take place. This is conducive to obtaining new connective tissue to replace the blood clot and differentiation of cells to cementoblasts in the laying down of new cementum on the root surface side of the pocket in order to incorporate new fibers within it. This must be accomplished before the epithelium exerts its full downward growth. Dr. Cohen's emphasis on the exploration of the lateral walls is most important since if they do present the same pocket depth as the interseptal portion the epithelium has an increased opportunity of proliferation which would be conducive to failure. The topography of the infrabony pocket, indicative for the selection of the reattachment operation, must be that of an inverted cone the apex of which points toward the apex of the tooth. The more this condition is present the better are the chances for success. In presenting this work of successful reattachment to an Academy audience consisting of periodontists with vast experience and guests with a minimal, the lecturer must be very careful to point out the indications for its use and the factors that are conducive to its success. The experienced periodontist is equipped with a clinical knowledge of the prognosis of this projection but the inexperienced clinician is apt to evaluate this therapy on the basis of extensive application. We are convinced that our research and clinical development should proceed along the lines of enhancing the therapy which produces reattachment but we are also aware that the biologic limitations have to be considered in applying it.

Wound Healing

by DR. EDWARD LEE HOWES, M.D., D.SC., F.A.C.S., *Columbia University, School of Medicine, New York, N. Y.*

Dr. Howes presented a very interesting review of the process involved in wound healing and emphasized some interesting concepts. He spoke of the wound as being a parasite of the host and that the wound itself could mobilize all metabolites necessary for its healing. In elaborating upon the concept that the wound is the parasite he pointed out that the wound can borrow carbohydrates from the liver and protein from the muscles even though the diet of the individual is low in either material. Interference with wound healing is therefore not often a problem of general metabolism. He presented a time schedule consistent with primary wound healing. He said that on the third day the blood vessels begin to sprout, cause of sprouting unknown, but vasodilatation was not the reason. Fibroplasia is evident on the fourth and fifth day with some beginning epithelization devoid of keratinization. Combined sprouting of blood vessels and fibroplasia formed granulations from which fibroblasts disappeared with a laying down of collagen fibers. The process that completes the undifferentiated cicatrix ends at about the 14th day. Dr. Howes pointed out that the epithelium in wound healing was usually derived from the basal layer of pre-existing epithelium and the cells evidenced an amoeboid motion in their effort to cover connective tissue. He stated that the ordinary rate of epithelial growth was .5 of a millimeter per day. Epithelization is quite a different process than fibroplasia.

In experimentation with the healing of wounds, Dr. Howes stated that cortisone will delay the process of formation of granulations but only when administered in high dosages. The local use of cortisone acted in the same way. Epithelization was not inhibited. He mentioned that Triazalopyrmidine inhibits epithelial growth but not fibroplasia and only so long as it is administered. The effect of this drug seems to be to prohibit the nucleus of the cell from initiating mitosis.

Dr. Howes introduced an interesting concept in which enzymes are liberated by the phagocytic cells and become an integral part of the healing process. He questioned the

validity of using antiseptics on wounds in order to eliminate bacteria and pointed out that quantitative studies done shortly after using antiseptics revealed that similar numbers of bacteria were present. He felt that the application of antiseptic solutions on wounds had an inhibitory effect on healing since they destroyed the growing cells and the enzymes conducive to proper healing. He felt the daily use of antibiotics locally did not sterilize the wound.

In relation to our particular problem, that of dealing with wounds in the oral cavity, he advanced the idea that the key to the successful handling of these problems may be in the mucin of the saliva. He felt that very little is known about mucin particularly the mucoproteins. He felt that the mucoproteins play a large part in the resistance picture to bacteria along with the enzyme systems. Certain studies have shown that injury increases the amount of mucoprotein in the blood. The normal mucoprotein content is .1 percent while almost immediately after injury it rises to .3 percent.

Symposium on the Surgical Approach to the Periodontal Problem
Procedure for Gingivectomy

by ARNOLD A. ARIAUDO, D.D.S., *San Diego, Calif.*

Dr. Ariaudo reviewed the accepted principle of gingivectomy and added a revealing discussion of pocket marking. The basis of his discussion was the analysis of the merits of eliminating the soft tissue side of the pocket to the bottom of the pocket only, as opposed to the elimination of this tissue including the epithelial attachment and granulomatous tissue to the level of the alveolar crest. Your reporters gathered that it was Dr. Ariaudo's contention that it was better to remove all of the soft tissue to the crest of the alveolar process. This affords the opportunity for new granulation tissue to form and a new epithelial attachment emigrating from the cut surfaces on the buccal and lingual. This difference of opinion has been under discussion for a long time and Dr. Ariaudo presented some very good arguments in support of the removal of the granulomatous tissue. His lecture was supported with some excellent slides, both as to procedure and results.

Procedure for Osseous Resection

by CLIFFORD OCHSENBEIN, D.D.S., *Austin, Texas*

Dr. Ochsenbein presented a very interesting discussion of the differences in the architectural form of the bone as a result of periodontal resorption. He emphasized that the deformities occurring were the result of the pathologic process and that the soft tissue aspect of the lesion was only half of the problem. He stated that incision alone at right angles to the crestal bone was in many instances insufficient. Dr. Ochsenbein demonstrated many interesting slides in which he illustrated the separation of the soft tissue from the underlying alveolar bone, depicting the variation in its topography. His slides also demonstrated very well various techniques that could be used in re-shaping the alveolar bone to conform more ideally with the requirements of a healthy gingiva. His diagrams of interproximal craters and their variations and corrective procedures which can be applied were excellent and he emphasized that the treatment of cases in which osseous resection was indicated was a matter of the correction of the entire periodontium. He recommended the use of chisels, Fox stones and files for this projection. Periodontal therapy is being projected more and more in the direction of plastic correction of the entire periodontium and your reporters feel that this is progress. It was

interesting to note the very active discussions which followed Dr. Ochsenbein's presentation with the knowledge that many people in the audience were prosecuting similar techniques. There was some question in the discussion concerning the extent of post operative pain and Dr. Ochsenbein was of the opinion that a case properly operated with a minimum of trauma and post operative care elicited a minimum of post operative pain.

Procedure for Gingivoplasty and Osteoplasty

by GERALD KRAMER, D.M.D., *Lynn, Mass.*

Dr. Kramer gave a lucid account of gingivoplasty based upon the philosophy of returning the periodontal tissues to the ideal in relation to form, function and esthetics. He emphasized that the object of the periodontal therapy should be what he called a physico-plastic approach as well as that of pocket elimination, directed toward the prevention of recurrences. He mentioned some of the indications as the elimination of craters and clefts and the correction of blunt and thick gingival papilla as well as the correction of faulty tooth contours and gingival adaptation. He made an interesting comparison of gingivoplasty with the art of festooning dentures as being the first contact that a dentist has with the orientation of the gingiva to the teeth.

In discussing osteoplasty he reiterated the importance of the elimination of ledges and craters and the modification of involved bifurcations in the direction of producing self-cleansing areas and interproximal sluiceways. Dr. Kramer suggested the use of a tetracyclene in the dressing pack.

The principle that subgingival curettage should precede plastic correction of the gingiva was advanced on the basis of the necessity of evaluating gingival contour free of the influence of irritation.

Procedure for the Reduction of the Mucobuccal Fold and Frenii

by ALVIN C. HILEMAN, B.S., D.M.D., *Seattle, Washington*

Dr. Hileman reviewed the present knowledge of mucobuccal fold extension and presented some excellent slides of the normal muscle attachments in the skull. These served to illustrate very well the principle of muscle attachment pull upon the gingiva and its possible contribution to pocket extension. He emphasized the use of a stent in this operation and showed examples of the application of the procedure to the lower anterior as well as the upper with an interesting instance of muscle pull contributing to an infrabony pocket. He showed an example of the reduction of a posterior vestibule involving primarily the buccinator muscle with a good result but felt that the lower anterior area was the most promising for this particular technique.

Procedure for Management of Bifurcation Problem

by JACOBY T. ROTHNER, D.D.S., *Philadelphia, Pa.*

Dr. Rothner opened his discussion by stating that bifurcation and trifurcation involvements were poor risks to begin with and that the cases selected for treatment should be chosen on the basis of some orderly criteria. To this end he listed the following seven points to be considered when treatment is elected: (1) Mobility—can the tooth be depressed or moved in more than one direction. (2) Depth of pocket—if depth is more than one half the root length, contraindicated. (3) Type of pocket—tortuous etc.

(4) Position of roots—spread or close proximity. (5) Type of bone support—poor trabecular pattern contraindicated. (6) Relation of affected tooth to adjacent teeth. (7) The crown-root ratio.

He elaborated on the above list of criteria in emphasizing the importance of careful selection of cases to be treated. Dr. Rothner felt that it was exceedingly important to check the occlusal factors in these involvements before and during treatment and stressed the fact that a re-shaping rather than grinding was the essential feature. He recognized the hazard of the exposed root surfaces to sensitivity and caries and recommended the use of silver nitrate as a preventive for both. Dr. Rothner's technique for the treatment of these involvements is essentially the removal of excess tissue to produce the proper accessibility for home care. He stressed this latter feature and recommended the use of many devices for the patient's use. He felt that when properly selected periodontal involvements including the bifurcation and trifurcations could be successfully treated using a five year period as a basis.

COMMENTS: The above symposium was a good statement of our present position in relation to the use of surgery in the treatment of periodontal disease. The rather general acceptance of these techniques, as part of the armamentarium of the periodontist, is gratifying. Unless or until we can direct our therapeutic endeavors toward the re-growth or rehabilitation of the tissues lost in the disease process we must approach the treatment on a plastic basis to re-create the normal relationship of the supporting structures at the new level made necessary by the disease. As was stated by several of these essayists this approach must not be directed toward the elimination of the pocket or lesion alone but must also be prosecuted on the basis of the prevention of recurrence. It is very often possible for the clinician to be lulled into a sense of security as far as control is concerned by the clinical appearance of the gross gingival tissue after treatment. Careful analysis of the two dimensional x-ray on the basis of three dimensional topography of the alveolar bone is necessary before the operator can be assured that his therapy has been sufficiently inclusive.

These papers were exclusively technical and as such we wonder if they merit the time on our program which was allotted. It is very difficult to demonstrate or teach a technique from the lecture platform. These procedures have to be learned by clinical experience and essays of this type can only stimulate the uninitiated or flatter the accomplished clinician. It is axiomatic that our programs should have a diversified appeal both practical and basic, but our practical essays should be as fundamentally instructive as possible.

Orthodontics in Periodontics

by JOHN A. KOLLAR, D.D.S., *Chicago, Illinois*

Dr. Kollar presented a very interesting paper in which he dealt primarily with active removable orthodontic appliances. In introduction he stated that migration of teeth is a serious problem in periodontal disease, and the correction thereof must be an adjunct in its treatment. He pointed out that the purpose of this repositioning is to produce better function, esthetics and better health to the periodontium. The normal dentition is subject to constant change, both morphologically and functionally as exemplified by the processes of eruption, mesial distal attrition, mesial drift and abrasion. He included the forces of growth and those of the muscles of the lips, cheek and tongue as contributory to tooth displacement. He emphasized that any disharmony can produce a disruption of the normal dental pattern which would possibly result in pathologic migration of one or more of its members. Failure to restore missing teeth as well as the insertion of faulty prosthetic appliances are capable of producing migration.

Dr. Kollar felt that the correction of alignment deviations by the periodontist was best obtained by the use of the active removable orthodontic appliances. He emphasized that they had to be properly designed and properly applied. These appliances have the advantage, in his opinion, of producing intermittent pressure with periods of rest and repair which he felt is highly desirable. He quoted various references including Gottlieb. These removable appliances consist basically of a tissue and tooth borne base into which

arch wires and springs are incorporated. Some of the bases are constructed with what he called a split plate. These split plate appliances are fabricated with an adjustable screw designed to produce expansion. These appliances commonly referred to as the "Hawley" are fabricated either with or without bite planes and labial arch wires. He mentioned that labial arch wires, springs and other adjuncts can be added either temporarily or permanently to prosthetic appliances. Some excellent illustrations of various types of appliances which can be used were presented. There are several advantages of the removable active appliances, namely the functional stimulation and rest periods, the facility for hygiene and lack of injury to the gingiva. He emphasized that the force exerted on teeth to be moved must be kept within physiologic limitations and its direction must remain controlled. Above all he felt that periodontal disease must be eliminated prior to any tooth movement.

It was Dr. Kollar's opinion that grassline or wire ligatures were not satisfactory except in very simple problems because of a lack of control. Dr. Kollar cautioned his audience that as a result of tooth movement traumatic occlusion might result which would have to be corrected concomitantly. He also stated that age was no particular factor if the principles outlined were adhered to but that problems could be precipitated if the biologic and physiologic principles were ignored. The lecture closed with Dr. Kollar stating that any moved teeth must be splinted and retained in their new position. He was enthusiastic about recommending the use of orthodontics in the treatment of periodontal disease and felt that it contributed much to increased function and improved esthetics.

Discussion

by DR. JEROME H. SKLAROFF, *Philadelphia, Pa.*

He opened by saying that he was quite amazed at the amount of orthodontic tooth movement being presently performed by periodontists. In contrast to Dr. Kollar, Dr. Sklaroff preferred fixed appliances for tooth movement stating that the fixed appliance is under complete control of the orthodontist and cannot be changed or altered by the patient. He said that a difference of opinion exists in dentistry relative to the merits of the principle of constant pressure as opposed to intermittent pressure. Many orthodontists, in his opinion, like to keep teeth moving in order to eliminate any possibility of a jiggling effect. In contrast to Dr. Kollar's view, Dr. Sklaroff felt that the tissue borne appliances could be as guilty of interdental irritation as the fixed and that certainly improper clasps could produce damage. Dr. Sklaroff pointed out the relationship of stability of results to the severity of periodontal disease, namely; that if the alveolar bone loss is great the movement will be rapid but the tendency to return to its original position will be greater and therefore the necessity for rigid splinting paramount.

COMMENTS: Your reporters felt that while the case for orthodontic movement in periodontal therapy was well advanced by this discussion that not enough emphasis was placed upon the limitations of the periodontist and his training in executing cases of orthodontic movement beyond his ability. The periodontist has long been plagued by the reticence of the orthodontist to undertake tooth movement, simple or otherwise, which would enhance his therapy of periodontal disease. Consequently the periodontist confronts a paradox in the appreciation for the necessity for this kind of therapy without the proper tools to execute it. This probably reverts to the curriculum in education in which both our undergraduate and graduate students in periodontia receive minimum training in orthodontia. We believe that the relationship between periodontal disease and malocclusion and malarrangement is intimate and consequently the orthodontist must be ready to appreciate the problems of the periodontist and also the periodontist must train himself in the skills of tooth alignment in order to enhance his therapy. It is our responsibility to encourage the orthodontists to pay particular attention to the health of the periodontium of their patients both during and after treatment.

Is Prophylactic Occlusal Adjustment a Justifiable Procedure?

by DR. ROBERT L. REEVES, *Santa Monica, California*

Dr. Reeves presented a very interesting discussion concerning occlusal adjustment as a prophylactic measure and restricted his remarks to this phase. He pointed out that the problem of prophylactic occlusal adjustment is a topic of greater and greater interest to the profession and consequently it would be well to consider what this therapy is designed to prevent. He reviewed the changes that can occur in the periodontium resulting from excessive forces exerted on the teeth, and concluded that occlusal overloading was not specifically etiological for gingivitis, gingival hyperplasia or pocket formation except in instances where it produced migration of teeth. He felt that pocket formation may only be accelerated by traumatic occlusion and consequently periodontal disease cannot be treated by occlusal adjustment alone. He emphasized that traumatic occlusion alone cannot produce apical migration of the epithelial attachment.

Dr. Reeves said that there were actually two schools of thought relative to this subject. The first group feel that any disharmony among the intricate parts of the masticatory mechanism results in pathology and that all or individual parts of the whole will suffer. The second group feels that the only time that force can be exerted on teeth and resultant harm ensue is when the teeth are in contact. They feel that since contact in mastication is insignificant it is afunctional movements that are capable of producing damage.

Dr. Reeves felt that since these two distinct schools exist that it was difficult to determine just what prophylactic occlusal adjustment would cover and to that end he sent out a questionnaire to ten selected experts and asked the question, "Do you feel that occlusal adjustment is routinely indicated in the absence of pathology?" His report, in answer to this question was interesting. Seven said no, one said yes but did not do major adjustments for adults, two hedged saying that potential trauma should be recognized and corrected. Of those who said no, several qualified their answers by saying they would correct gross abnormalities in the treatment of bruxism, or for esthetics or in orthodontic treatment and oral rehabilitation.

Dr. Reeves pointed out the importance of early recognition of excessive contacts in afunctional movement. In his conclusion he made an important observation toward the attempt on the part of most of us to fit occlusal patterns into a "normal" and suggested that in the process of evolution occlusal patterns would change, and therefore the difficulty of establishing a normal occlusion even now was of the first magnitude. He ended with a word of caution about promiscuous treatment which might affect the "negative occlusal sense" particularly when used as a prophylactic measure.

Discussion

by DR. MORTON AMSTERDAM, *Philadelphia, Pa.*

Dr. Amsterdam agreed with Dr. Reeves in the principle that prophylactic occlusal equilibration was not wise as a routine measure but stressed that the adaptability of the patient toward stress and capacity for repair was an individual problem. Dr. Amsterdam questioned our ability to produce a permanently balanced occlusion in every individual. He pointed out the impossibility of doing commonly accepted essential dentistry for the populace at the present time and therefore took a conservative view of instituting as a routine procedure a prophylactic measure of uncertain value such as occlusal equilibration.

COMMENTS: We think that the timing of any particular therapeutic procedure in the treatment of periodontal disease should not necessarily be a rule of thumb but rather dependent upon the diagnosis, evaluation and re-evaluation of the patient. Throughout the active treatment of any case of periodontitis periods for re-evaluation are a necessary part of the treatment plan and details of one therapeutic procedure or another can be projected and executed according to the needs of the case and the attainment of the objective.

This principle is particularly true of occlusal adjustment. The periodontium of teeth suffering from periodontitis, and occlusal stresses beyond a normal range, is affected by inflammation. This inflammation can change the periodontium so that the position of the teeth in relation to excessive trauma is augmented. The reduction of the inflammatory process allows for some degree of realignment of the tooth within the periodontium and consequently may reduce some of the positional factors which emphasized the occlusal stress. If this premise is correct then occlusal equilibration should be done after those therapeutic procedures are executed, which are designed primarily to reduce inflammation. On the other hand certain occlusal stresses are of such a degree and magnitude that they should be grossly corrected before or at the same time that procedures directed toward the elimination of inflammation are executed.

We find ourselves in full agreement with Dr. Reeves as to the position of occlusal stress in the etiologic pattern and therefore are loathe to condone it as a so-called prophylactic measure for cases without demonstrable pathology.

Splinting in Periodontics

by DR. LEONARD HIRSCHFELD, *New York, N. Y.*

This paper was a very enlightening and exacting piece of work in which in a short time Dr. Hirschfeld covered the subject of Splinting in Periodontal Therapy exceedingly well. By way of introduction he pointed out that tooth mobility commonly results from periodontal disease and can prevent complete healing. He emphasized the importance of afunctional contacts during clenching, the stresses placed on an inadequate number of teeth and faulty prosthetic appliances in the production of mobility. Splints were classified as temporary and permanent with subdivisions of fixed and removable for each.

The purposes for the use of temporary splinting he enumerated as follows: to decrease mobility and therefore trauma to the periodontium during and after treatment, to hold teeth firm during curettage and occlusal equilibration, to stabilize those teeth with a questionable prognosis for subsequent re-evaluation, to join teeth together as a buttress to enable the orthodontic movement of others, to hold teeth in new positions after orthodontic movement, and to support teeth loosened by trauma or those with acute periodontitis.

Under fixed splinting, in the temporary category, he listed the use of stainless steel wiring in the figure eight pattern for two teeth, and for more, the labial and lingual arch wires with interdental ligation. He felt that dental floss was a very temporary measure. He recommended the use of metal bars either labially or lingually or both which were fixed at both ends, and to which the mobile teeth were ligated. In the lower anterior he often solders the bars to orthodontic bands adapted to the cuspids. The latter has the disadvantage of interdental separation.

The open end cast splint is used as a temporary splinting measure and can be ligated and/or cemented. This splint should be designed just above the height of contour and it is particularly adaptable to the posterior teeth. He also mentioned the provisional gold and/or acrylic splints which are used on rough tooth preparations prior to permanent splinting. The removable appliances he suggested to be used as a temporary measure were the various wire and acrylic plates designed more for passive than active force and the cast splints of metal with both ends closed and often used with clasps for retention. Occlusal splints for night grinding were mentioned.

In discussing permanent splinting Dr. Hirschfeld stated that the main purpose was to distribute the load over as many alveoli as possible and in doing so discussed the advantages of splinting around corners following the principle that the more forces countered advantageously by a splint the more ideal. Adequate permanent splinting prevents excessive lateral stresses, particularly where a good deal of support has been lost, and distributes additional load of fixed bridges or partial dentures over as many abutments as possible. The permanent splint can be utilized to correct food impactions and to prevent extrusion of important teeth without opponents, and lastly permanent splints can be used justifiably as retainers after teeth have been moved to correct positions. This procedure must be in accordance with the operator's ability to prognosticate in his planning whether or not the etiologic factors for migration can be permanently corrected.

Under permanent splinting Dr. Hirschfeld again divided the types into two kinds—the fixed and the removable and under the fixed splinting pointed out the advantage of bridges with veneer crowns in which the metal cores were soldered together. He cautioned against the use of individual unit porcelain splints with cervical solder joints where there was not proper space for the gingival papilla. He mentioned the use of porcelain fused to metal and pin ledge castings soldered together and called attention to a type of horizontal pin casting in which the pins pass from lingual through to the labial. In discussing removable appliances for permanent splinting he stated that these should be completely tooth borne and should comply with the highest standards of partial denture design. Secondary bars, accessory clasps and incisal fingers may be incorporated.

In general Dr. Hirschfeld pointed out the factors which were important in the selection of the method of stabilization and considered these factors on the basis of purpose of the splint and the distribution and condition of the teeth to be splinted. He said here that complete immobility was not necessarily required of all teeth. He stated that anterior teeth can tolerate a 1 to 1½ degree of mobility while 1 degree of mobility after treatment is tolerated in the posterior. He felt that no mobility could be tolerated in a tooth to be used as an abutment. He emphasized that the final splinting treatment plan must be evolved after the periodontal treatment is complete and possible transient systemic factors may have altered favorably. Several mobile teeth can be splinted together to their mutual advantage which is increased by terminating the splint with sound teeth. Dr. Hirschfeld felt that in analyzing and selecting the kind of splinting to be used the direction of forces to be resisted and their degree must be determined by an analysis of the occlusal habits. He emphasized that a complete analysis of the patient in the selection of splinting was also paramount in relation to caries, age, health and temperament of the patient, the potentiality for hygiene and the suitability of individual teeth in respect to size, shape, relation of the lip line, pulp size and form.

Discussion

by DR. JOHN S. MCKENZIE, *Miami, Fla.*

This very comprehensive paper was discussed by Dr. John S. McKenzie of Miami, Florida. Dr. McKenzie was particularly emphatic in pointing out the harm that is produced by errors and abuses of extensive splinting and reiterated the need for exact fabrication to avoid poor margins and poor contours. Dr. McKenzie also stated that full coverage may produce mutilation and poor esthetics from the creation of poor contour and poor occlusal form.

COMMENTS: Dr. Hirschfeld has made a very definite contribution in compiling all of this information in one very excellent paper. The present tendency toward the development of new ideas of splinting can

very well result in a benefit to periodontal therapy. Each and every patient has to be analyzed on the basis of the factors presented bv Dr. Hirschfeld and the type and extent of splinting to be used must be carefully planned to accomplish permanent results. The enthusiasm of some operators for extensive permanent splinting sometimes produces a false security in the operator's opinion of the success and the validity of the uses of extensive splinting. This can only be evaluated after the test of time has been applied to individual cases. The most important facet of diagnosis and planning of splinting therapy is an intelligent analysis of the relation between the remaining attachment apparatus of the tooth and the occlusal forces that it is expected to withstand. The judicious use of splints is primarily dependent upon the operator's clinical experience in other fields of dentistry and his analysis of oral physiology as well as the patient.

Panel Discussion: Case Planning

by SAUL SCHLUGER, D.D.S., *Jersey City, N. J.*; B. O. A. THOMAS, M.S., PH.D., D.D.S., *Palo Alto, California*; CHARLES H. WILLIAMS, D.D.S., *Toronto, Ontario, Canada*; JACK ALLOY, D.D.S., *Philadelphia, Pa.*

A description of the oral findings in a patient with a variety of dental problems was presented in pamphlet form to the audience. The above panel then individually discussed their respective treatment plans. Dr. Schluger presented the case initially and made the summation.

The diagnosis of Periodontitis was unanimous and local irritational forces, including the previous dental treatment, was held to be chiefly responsible for the patient's periodontal condition. Each panelist prescribed the removal of the same hopeless teeth, in a varying sequence, with the exception of the upper left first molar which was causing pain.

The case selected for analysis did not present any outstanding opportunity for controversy in respect to the specific periodontal treatment. The panelists were in accord with the use of scaling and curettage to reduce inflammation, gingivectomy to eliminate deep pockets and the mucobuccal fold extension operation to control muscle pull upon affected gingiva.

One of the panelists suggested the removal of one of the lower anterior teeth to alleviate their crowded relation. He believed the remaining teeth might realign without regulatory treatment. If not, he would apply orthodontics.

It was gratifying, in as much as all of the panelists were periodontists, that so much attention was paid to the restoration of the teeth toward the resolution of the entire problem, both occlusally and supportively. One of the panelists projected this aspect farther than the others in the use of temporary, provisional and permanent fixed splinting. He suggested a variation in the treatment sequence by using temporary splints before any specific periodontal therapy. He suggested that the entire maxilla be tied together after the completion of periodontal therapy and occlusal equilibration. This latter suggestion was questioned by a member of the audience on the basis that the maxilla acting as a unit increased the tendency of the mandibular teeth toward mesial drift, especially in the bicuspid-cuspid contact which in this case was abnormal. He also suggested that unit splinting of the maxilla might produce an abnormal load upon the lower left second molar which was inclined mesially. One of the panelists suggested a diet survey because of the high caries index in a middle aged patient.

COMMENTS: The presentation of a case for treatment planning was a fitting close for this primarily clinical program. It was interesting to note that many of the features elected here for prosecution had been discussed in the preceding essays.

Your reporters question the validity of the presentation of one case for treatment planning which allowed only a minimal time for audience participation. Education in treatment planning is a desirable asset to our programs but we think it is better to present several cases which illustrate differences in

indications for treatment and even those which are controversial. This device is very difficult to implement properly with only inanimate evidence available. Perhaps with the advancement of television techniques this feature can be improved.

REPORT OF THE AMERICAN BOARD OF PERIODONTOLOGY YEAR 1955-1956

The Board has held three meetings in the last fiscal year, a midwinter meeting in addition to the Spring meeting for examinations and the fall annual meeting. Nine candidates were certified as diplomates out of eleven who took the examinations. Most of those now taking the examinations have had two academic years of postgraduate education but a few who applied in 1952, on the one year basis have had the time of their application extended, because duty in the Armed Forces has made it impossible to complete their procedures within the three year period. Eighteen applicants are eligible for examination this coming year and a few more are expected before January first.

At the February meeting, the Board adopted the two academic years in a recognized educational institution devoted to education and training in periodontology and its supporting subjects as its only standard of postgraduate education. So called equivalent education gained by practical experience, teaching, the taking of many short courses, hospital attendance, preceptorships, etc. is no longer accepted. This standard precludes many older practitioners with established practices and financial responsibilities from preparing for certification and this is to be regretted. The many advantages accruing from the high standard much more than offset this disadvantage. After all, the lack of certification does not prevent any dentist who is proficient in periodontics from practicing it successfully.

In 1947, when a two year postgraduate curriculum was first set up, it was difficult to prepare without padding and much repetition of undergraduate material. Now in the better institutions the staffs are finding it difficult to limit the time to two academic years because there is so much advanced material which should be included. So fast is the field developing. There are now fifteen universities offering graduate or postgraduate courses leading to a one or two academic year full-time postgraduate program.

There is still a great need to have the Academy define the field of periodontology, that is outline the phases of basic science and dental subjects which should be included in the postgraduate preparation for certification or for teaching in this field. This definition has been requested from the Academy for several years but has not been forthcoming.

In some local districts the Ethics Committees are having difficulty with periodontists who announce themselves as limiting their practice to periodontics, doing bridge and inlay reconstructions under the guise of splinting. The Board has never advocated limitation to periodontics on the part of its diplomates for the very reason that reconstructive procedures are often an essential part of periodontal therapy. It might be well for the Academy to consider this matter in its Ethics Committee.

The treasury of the Board is somewhat depleted by an extra meeting last February and a small group of candidates last April.

Harold J. Leonard,
Secretary-Treasurer

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Periodontist's Confession

When I was young, and in my prime,
I used to scale teeth all the time;
But now that I am old and gray,
I cut the gingiva away.

Both plans work well, if done with care,
Either can be done, to be quite fair,
But the latter wins in one big way,
Patients are *impressed and quick to pay.*

Announcements . . . .

AMERICAN ACADEMY OF DENTAL MEDICINE ANNOUNCES ANNUAL MEETING

The American Academy of Dental Medicine will hold its Eleventh Annual Meeting in Boston, Mass., from Wednesday, May 29, 1957 to Sunday, June 1, 1957, at the Hotel Sheraton Plaza. The theme of the scientific sessions will be PAIN; the essayists will be distinguished and well-known members of the medical and dental professions.

A program of social events and sightseeing has also been prepared for the registrants and their families. All Academy members and interested members of the medical and dental profession are cordially invited to attend. Details regarding the program and reservations may be obtained by addressing Dr. Arthur Gold, Chairman, 26 Maple Street, Springfield 3, Mass.

THE UNIVERSITY OF ALABAMA SCHOOL OF DENTISTRY

March 2 and 3, 1957—Insurance, Investment and Estate Planning—Mr. A. Key Foster, Mr. Carl P. Heartburg, Mr. Plato Britton.

March 14, 1957—Income Tax Guidance—Mr. S. Grady Fullerton.

March 23, 24, 25, 1957—Periodontology—Dr. William McIntosh.

Messrs. Foster, Heartburg and Britton are the heads of their respective departments within the Trust Department of the First National Bank of Birmingham, Alabama's largest banking institution.

Mr. Fullerton is a tax expert, specializing in medical and dental problems, a Certified Public Accountant and an Associate Professor of Accounting at the University of Alabama. Dr. McIntosh is Associate Professor of Periodontology on the Dental Faculty, University of Toronto.

For information regarding these courses, write Arthur H. Wuehrmann, D.M.D., Associate Dean and Director, Refresher Course Program, 1919 7th Avenue South, Birmingham 3, Alabama.

THE AMERICAN INSTITUTE OF DENTAL MEDICINE CASE HISTORY SERVICE

The Institute continues to offer Case Histories from the broad field of Dental Medicine for the year 1956-57. These will include original 35 mm. Kodachrome slides of the oral condition, pertinent laboratory findings, medical background, roentgenograms, photomicrographs, diagnostic criteria and whatever else may be indicated in each individual case, with a "general discussion" of the disease. A loose leaf binder and matching Kodachrome slide box will be furnished to each participant. The fiscal year of the Institute begins October 1st.

This monthly service began October 1952 and has met with outstanding success. During these four years it has provided a total of 683 one-year subscriptions and the Histories were accompanied by 100 Kodachrome slides.

Anyone subscribing to this CASE HISTORY SERVICE is entitled to full membership in THE AMERICAN INSTITUTE OF DENTAL MEDICINE. Members of the A.D.A. or A.M.A., or their foreign equivalent, are eligible to apply. Due to the great demand for this Service, it is recommended to subscribe at an early date for assured and immediate delivery.

For further information address all communications to the Secretary, Mrs. C. Novembri, 2240 Channing Way, Berkeley 4, California.

THE CALIFORNIA ACADEMY OF PERIODONTOLOGY

The California Academy of Periodontology United States Section ARPA Internationale (Academie Researchae Periodontoligae), is endeavoring to interest libraries and others in LES PARADONTOPATHIES, a summary of scientific papers and clinics presented at the 14th Congress of ARPA in Venice in 1955.

Many of our members journeyed to Italy to attend this Congress and meet renowned scientists from all over the world. The book contains reports, documents and papers on research in 400 pages, well illustrated. Summaries are printed in 4 languages. It is an excellent reference book for dental students, members of faculties, and all dentists interested in Periodontics (Paradontics). Additional copies have been made available and may be procured from: Secretary General of ARPA Internationale, 2 rue Bartholoni, Geneva, Switzerland. Price: 30 Swiss Francs. Consult your bank for correct currency exchange.

ARPA INTERNATIONALE COMMITTEE
Samuel B. Bleadon, Chairman, R. Thomas Dunkin, V. John Oulliber

Beg Your Pardon!

An announcement in the October 1956 Journal (page 320) erroneously stated that Dr. Irving Glickman was Associate Dean of Tufts University School of Dental Medicine. This institution has no associate dean; Dr. Glickman is Professor of Oral Pathology and Periodontology, and also Director of Graduate and Postgraduate Studies.

TUFTS UNIVERSITY SCHOOL OF DENTAL MEDICINE

Tufts University School of Dental Medicine, Division of Graduate and Postgraduate Studies, announces the following course.

DPG 603—Participation Course in Periodontology. Monday through Friday for one week from April 8 through April 12, 1957. Tuition $150.00. Class limited to 12. Dr. Irving Glickman and Staff.

Half of the time of the course is devoted to clinical practice by the participants. The remainder of the curriculum consists of lectures and seminars devoted to the theoretical and didactic aspects of periodontology. The histopathology of periodontal disease and the "Bone Factor" concept will be presented. The clinical management of periodontal disease is analyzed in detail with special consideration given to the various aspects of diagnosis, determination of prognosis, treatment planning, provisional splinting, and the gingivectomy technique.

For further information and application write to: Director of Graduate and Postgraduate Studies, Tufts University School of Dental Medicine, 136 Harrison Avenue, Boston, Massachusetts.

BETH ISRAEL HOSPITAL

A two-week seminar in Periodontia is scheduled for March 11-22, 1957. The objective of this seminar is to present to the practitioner all of the techniques employed in periodontal therapy as well as theoretical background. It will include etiology, diagnosis and treatment of various diseases of the teeth. Periodontal pocket therapy as well as an over-all mouth rehabilitation program will be stressed. Local environmental factors and systemic influences in periodontal therapy will be discussed. The material will be presented by lectures, demonstrations, and clinics. The tuition fee is $350.00.

Co-Directors of the Courses are: Henry M. Goldman, D.M.D., Bernard Chaikin, D.M.D.

For further information, write to: Director of Public Relations and Education, Beth Israel Hospital, 330 Brookline Avenue, Boston 15, Massachusetts.

UNIVERSITY OF MINNESOTA

The University of Minnesota announces a Symposium on Periodontal Problems, Saturday, March 30, 1957. The problems to be discussed are the lesions of the gingiva and oral mucous membrane. The clinical symptoms, histopathology, physiology and treatment for each of these lesions will be presented.

The faculty are: Joseph L. Bernier, Colonel DC, Armed Forces Institute of Pathology, Walter Reed Army Medical Center; Robert Gorlin, Associate Professor of Oral Pathology, University of Minnesota; Hans Mühlemann, Professor of Dentistry, University of Zurich, Switzerland; Henry Michelson, Professor and head of the Department of Dermatology, University of Minnesota; Stephen Rothman, Professor and head of the Department of Dermatology, University of Chicago; Ervin M. Schaffer, Clinical Associate Professor of Periodontology, University of Minnesota; Helmut A. Zander, Professor and Chairman of the Division of Periodontology, University of Minnesota.

This symposium will consist of a few lectures and mostly round-table discussions under the guidance of the faculty. Therefore, the attendance is limited to fifty-five. Fees for this symposium are: Registration, $8.00. Tuition, $20.00. Total, $28.00. Applications may be secured by writing to the Center for Continuation Study, University of Minnesota, Minneapolis 14, Minnesota.

THE UNIVERSITY OF TEXAS DENTAL BRANCH

A postgraduate course in Periodontics will be offered April 1-5, inclusive, 1957 under the direction of Dr. Martin Cattoni, Professor of Periodontics, University of Texas, Dental Branch, and with the participation of Dr. Helmut Zander, Chairman, Division of Periodontology, University of Minnesota, School of Dentistry; Dr. Hans Muhlemann, from the Department of Operative Dentistry and Periodontology, University of Zurich, Dental Institute; and Dr. Gunnar Bergstrom, of Sweden, at present a visiting professor at the University of Texas, Dental Branch.

The course will include lectures, practical demonstrations and round table discussions on the etiology, diagnosis and treatment of periodontal diseases. It is arranged for the general practitioner who is interested in becoming more familiar with the basic biological background of the periodontal diseases, as well as the various practical details of the treatment. Special emphasis will be placed on the problems of occlusion, mobility of teeth and the design of splints as a part of periodontal therapy.

The course will offer participants the opportunity to carry out on patients the various techniques of periodontal therapy.

Attendance will be limited. The tuition is $150.00, of which $50 must accompany the application, the balance payable on registration. The Dental Branch reserves the right to cancel the course if necessary, in which case the tuition fee will be refunded. For information contact: Dr. Sumter Arnim, Director, Postgraduate School of Dentistry, University of Texas, Dental Branch, P.O. Box 20068, Houston 25, Texas.

RESEARCH ON HIGH SPEED AND ULTRA SONICS TO BE REPORTED AT THE EIGHTH ANNUAL BERKSHIRE CONFERENCE

One of the highlights of the Eighth Annual Berkshire Conference in Oral Pathology and Periodontology to be conducted by Tufts University School of Dental Medicine at Eastover in Lenox, Mass., June 16-20, 1957, will be the report by Colonel Joseph L. Bernier, Chief, Branch of Dental and Oral Pathology Armed Forces Institute of Pathology, of a special research project on "The Effects of High Speed and Ultra-Sonics on Dental Tissues". Because of the importance of this subject a research project is currently in progress at the Armed Forces Institute of Pathology in which the pulps of teeth subjected to high speed and ultra-sonics technics are being examined microscopically. It is anticipated that the information which will evolve from this project will provide a valuable guide for the clinical use of these two methods of tooth preparation, particularly in so far as it may indicate the manner in which these technics may be used with a minimum of injury to the teeth. The entire project will be discussed and the actual tissue slides will be available at one of the sessions of the Conference so that each participant will have the opportunity of examining the material and evaluating the findings first hand. This research was undertaken as a special project of the Berkshire Conference and the report will be presented there for the first time.

Division of Graduate and Postgraduate Studies, Tufts University School of Dental Medicine, 136 Harrison Avenue, Boston 13, Massachusetts.

TEMPLE UNIVERSITY SCHOOL OF DENTISTRY POSTGRADUATE COURSE IN PERIODONTICS

Temple University School of Dentistry announces the presentation of a two-weeks postgraduate course in Periodontics by Dr. Jacoby Rothner and Staff, beginning March 4 to March 16, 1957.

Fee: $200.00 Enrollment 12.

For application and information apply to: Dr. Louis Herman, Director of Postgraduate Studies, Temple University School of Dentistry, 3223 North Broad Street, Philadelphia 40, Pennsylvania.

NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

Theoretical and practical application of periodontal diagnosis and techniques to general dentistry. Four lectures and six clinical demonstration sessions. Equilibration of occlusion is performed by the student on casts. Patient demonstrations include equilibration of occlusion, conservative and radical therapy, home care, etc.

Date: February 20-May 1, 1957, Wednesdays.

Time: 4 P.M. to 6 P.M.

Fee: $211.50 including tuition, books, instruments.

This course will be given by Professor Samuel Charles Miller and associates.

For further information kindly write to the Secretary, Postgraduate Division, New York University College of Dentistry, 209 East 23rd Street, New York 10, New York.

Letters to the Editor . . . .

To the older workers in the Academy it is a source of great pride and satisfaction to watch the development of the Academy and of the science and art of periodontology as exemplified in the programs each year. At each scientific session and at the clinics we see questions answered by the researches of our younger members in problems that have long caused difficulties in our practices.

There are, however, some tendencies that to me do not seem good. One is the tendency to base periodontal practice too exclusively on oral pathology, with a resultant reliance on various surgical techniques for removing pathologic tissue. The stress should rather be on physiology with resultant emphasis on hygienic techniques. The Academy was founded on the work of D. D. Smith of Philadelphia who developed the idea of regular prophylactic treatments. Emphasis was on polishing and the elimination of irritating deposits and restoration of health by hygienic means.

The 1956 scientific program started with an excellent presentation of etiology by Henry Goldman. In his explanation of irritating deposits, however, his emphasis was on calculus when it should have been on the preceding, and much more irritating, deposits of bacteria and fungi on the tooth surfaces. Subgingival calculus is deposited in the bacterial fungous slime on the tooth surfaces, from tissue fluid coming from gingival linings already inflamed and ulcerated because of irritation from this slime. Subgingival calculus is in turn irritating partly because it incorporates irritating bacteria and fungi in its structure. Let us keep our eye on the ball. It is the bacterial fungous growth which is our main enemy.

I feel sure that the emphasis on surgical removal of pathologic tissue is because the possibilities for restoration of health to congested, inflamed tissues are not realized. When irritating deposits are removed, the gingivae must quickly heal and hug the tooth or the sulcus will again fill up with microbial slime and disease will be continued. To induce quick healing and hugging of the tooth by the gingiva, massage is used to force out the toxic products in congested gingiva and promote a vigorous circulation. This is done by a series of gentle but firm compressions of the gingival margins with the sides of the bristles of a stiff tooth brush. The ends of the bristles are not permitted to touch the gingivae at all. It is a method described in 1819 by Leonard Koecker and again more recently by William J. Charters. It is effective as I see it in my practice when other methods, such as the popular sweep from muco buccal fold to tooth surface, are ineffective. It seems to me to be based on physiologic principles. When irritants have been removed, and the patient has been taught to promote the gingival circulation by tooth brush massage, the tissues, with very few exceptions, return to health without surgical intervention. I find it unnecessary to contour the tissues even in cases of previous ulcerative gingivitis where interdental gingivae have been lost and interdental depressions exist.

The time necessary for freeing root surfaces of irritants and teaching home care usually runs from one to five hours. I note that many periodontists require many more hours than this, and I deplore this waste of time. Our function is to serve as many people as we can effectively. If we spend from two to ten times as much time as should be necessary on each case, we limit the number we serve and greatly increase the financial hardship of those we do serve. By learning and using what may be done by physiological means to restore health we can avoid surgical removal of covering tissues of the teeth and save much time and needless expense to those we serve.

Harold J. Leonard,
New York, New York

To the Editor:

The July issue of the Journal has a letter by Dr. Harold R. Schreiber in which he refers to an article published by us in a previous issue of the Journal (Carranza, F. A., and Carranza, F. A., Jr.: The management of alveolar bone in the treatment of the periodontal pocket. J. Periodont. 27:29-35, Jan. 1956). He says that in one of the illustrations (Fig. 12) which shows the before and after radiograph of a case of bone regeneration of the alveolar crest there is a difference in angulation both mesiodistally and vertically, that would invalidate its results.

Dr. Schreiber measured the length of the right central incisor in the before and after radiographs and found it to be 28 and 26 mm. respectively; this fore-shortening would tend to decrease the depth of the bony trough. However, he should have measured also

the depth of the bony trough which in the before radiograph is 6 mm. deep and in the after radiograph is 0. The technical artifact that shortened the right central incisor by 2 mm. should have shortened the bony trough by only 0.44 mm.

In the horizontal or mesiodistal plane there has been, according to Dr. Schreiber, a difference in angulation of about 20 degrees. Even if this is true there is no possible way for a lesion that size to be masked, especially since the width of the interdental space at the cemento-enamel junction is exactly identical in both radiographs.

The second radiograph, then, shows bone where none existed in the radiograph taken before treatment three years previously. This is what is called bone regeneration of the alveolar crest and is exactly what the illustration was intended to show.

I agree with Dr. Schreiber in that very similar radiographic technic is necessary for differences in bone levels to be comparable. This case, however, leaves no doubt that bone regeneration has taken place.

Fermín A. Carranza, Jr.
Callao 262
Buenos Aires, Argentina

To the Editor:

Upon returning home from the Atlantic City meeting of the Academy of Periodontology, I am moved to express three major reflections regarding the Scientific Program; the first is to compliment the Program Committee and the essayists for what appeared to me to be one of the finest over-all programs I have yet attended; the second is to encourage future program chairmen to make this year's Case Planning portion of the program an annual affair; and the third is to amplify briefly upon Dr. Jack Alloy's quotation from my article on "Dental Treatment Planning" in the September 1956 issue of the Journal of the American Dental Association.

The amplification is concerned with the basic philosophy of treatment planning and the utilization of that philosophy in the case presented. If we think of treatment planning in terms of four expanding dimensions, the first being the individual tooth, the second being the entire dentition, the third being the whole masticatory mechanism and the fourth being the total patient, it is apparent that there was very little discussion of the fourth dimension in the case presented. The handout and brilliant analyses of the case by members of the panel were limited primarily to the first three dimensions of treatment planning.

The fourth dimension, namely, consideration of the total patient, must have been considered favorably by the therapist in this case or such a splendid postoperative result could not have been obtained. But we in the audience and the panel, too, should have had the opportunity to consider the total patient, his general appearance, his occupation, his attitude toward dentistry in general and toward his own teeth in particular, the function of his mandibular joints, the character of the regional lymph nodes, salivary glands, lips, buccal mucosa, palate, tongue and floor of mouth. All such factors and structures, having possible relationship to the oral problem in question, obviously must be considered. The same oral conditions, with a less favorable fourth dimension, might have yielded an entirely different result.

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